Engineering News November 16, 1961

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ENGINEERING NEWS

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No. 7 November 16, 1961

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Bristol Siddeley seek Government aid

VTOL ENGINE AT STAKE

American grant to end for the £10m. Pegasus

BRISTOL SIDDELEY need Government aid if control of their £10 million BS-53 engines — earmarked for NATO — is to stay in British hands. The need for money to continue development of this Pegasus turbo - fan engine which is to power vertical take-off aircraft, is now under discussion at the Ministry of Aviation.

The engine's development has been 25 per cent paid for by Bristol Siddeley Engines and 75 per cent by the official United States Mutual Weapons Development Scheme.

The backing of the MWD scheme covered the experimental stage and ends in June. Well over £10 million is understood to have gone into developing the BS-53 engines, which are not yet in production. Some form of backing has to be found if the engine is to be carried from the development stage into production.

NATO projects

Pegasus engines are scheduled in a number of projects for NATO'S Basic Military Requirement 3, a VTOL fighter, and the NATO Basic Military Requirement 4, a tactical transport.

The BS-53 is a unique piece of aero-engine development. It gives its vertical lift through swivelled nozzles.

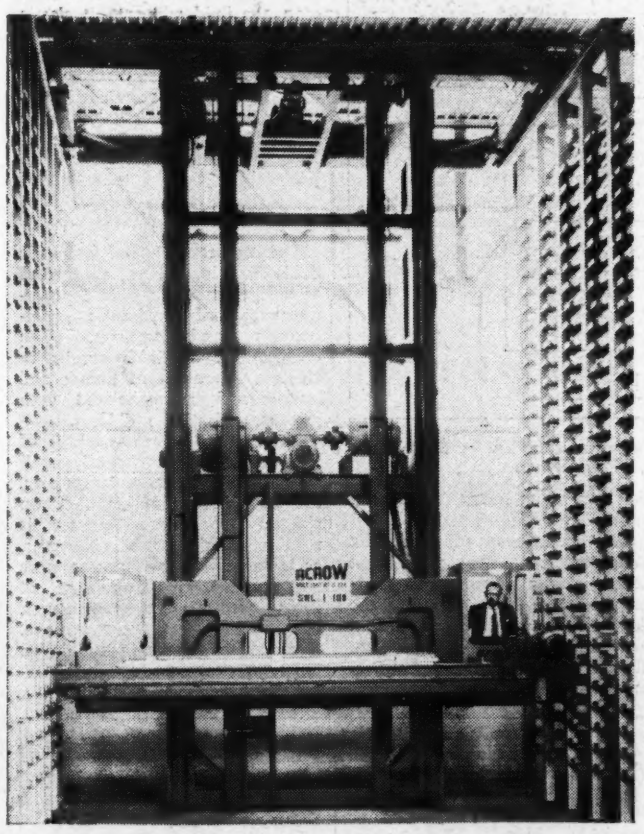
When the nozzles are radiated through only 60 degrees from the horizontal, 87 per cent of the total thrust component is available for lift and 50 per cent for horizontal thrust.

A more-advanced form of BS-53, the BS-100, is to be used in the D24 Alliance, vertical take-off strike fighter being developed by the United States Republic Aircraft and the Dutch Fokker.

Overseas interest in the Pegasus is thought to be strong enough to lead to the provision of private capital.

Another international association with a strong interest in seeing the Pegasus go into production is the joint enterprise of the British Aircraft Corporation with Finmeccanica, of Italy.

STACKER CRANE SAVES SPACE



AN efficient installation for handling and stacking pallets containing bundles of brass rods weighing up to a ton has been completed at the Birmingham works of United Non-Ferrous Metals, by Acrow (Engineers), of Paddington, London.

A crane system operates between two racks, the crane rails being placed directly on top of the racks at 17ft. 7in. centres.

Each rack has 300 openings to receive the pallets arranged in 10 vertical rows. The total capacity of the two racks is 600 tons of material.

The crane is a modified stacker crane having twin masts fixed to the upper structure which carries the longitudinal driving mechanism.

On the mast is a carriage having

● back page, col. 6

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THERMIC BORING CUTS BILLETS

SCRAP aluminium billets, each 24ft. long and 3ft. in diameter were recently cut to furnace size by thermic boring, at half the cost of mechanical methods. Each cut took 22 minutes.

The job was done by trained operators from the British Oxygen Co. at the works of International Alloys, Aylesbury.

In thermic boring, the tip of a lance made of gas piping and packed with small steel rods is heated until red-hot.

Oxygen is then blown through the lance, the heating is cut off and the reaction of iron oxidisation at the end of the lance is maintained by oxygen only.

The equipment is light, inexpensive and practically noiseless. It is ideal for use where the cost of mechanical cutting gear is too high.

Automation comes to rear axles firm

MORE than 60 per cent of the rear axle casings for heavy commercial vehicles are now being produced on a new automatic transfer machine at the Darlaston works of Rubery, Owen and Co.

The machine was designed and assembled by the firm's staff and many components were made within the Owen Group.

Major problems appeared in the final transfer machining where the use of a pressed-steel case, welded and then heat treated, presented formidable tooling obstacles.

This is probably the first time that a heavy pressed steel fabrication has been machined automatically.

The wide variety of casings used by the motor industry limits complete automation.

The plant works on a three-shift system, two operators being required on each shift.

Scooter engine for industry

A SMALL stationary engine introduced by B.S.A. Power Units is claimed by the makers to set a new standard for power-to-weight ratio and quietness of operation.

It is a 250 c.c. four-stroke two - cylinder engine, basically similar in design to the engine used in the B.S.A. Group's scooters.

Overhead valves are employed, and the maximum power output (variable speed version) is 8.6 b.h.p. at 5,000 rev./min. For constant speed operation the unit can be governed to 4,000 rev./min., at which speed the power output is 7.5 b.h.p.

Light weight

Aluminium alloy is used extensively in the construction of the power unit, and it weighs only 76 lb. complete with electric starter and generator.

Dimensions are 13¼ in. long (across crankshaft), 12 9/16 in. wide, and 17 5/32 in. high.

The sump is of cast alloy, has a capacity of four pints, and incorporates the mounting feet. Lubricant is pressure fed to all bearings and the valve gear.

A 12-volt starting and generating system is employed, an a.c. generator on the crankshaft providing current for battery-charging and ignition.

Cooling is by means of a fan and cowling, the cowling being treated with an acoustic compound to reduce the noise of the unit.

PARK GATE
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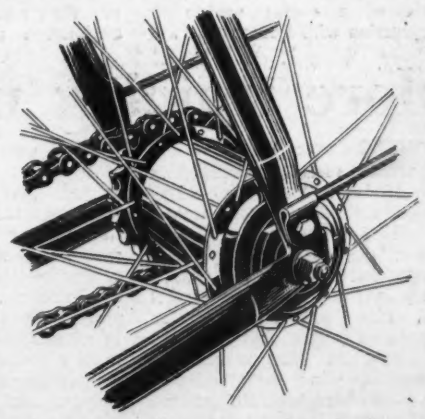

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CHICAGO HYDRAULICS CONFERENCE

U.S. technologists discuss the latest developments

THE National Conference on Industrial Hydraulics, organised by the Illinois Institute of Technology, was held recently in Chicago.

The scope of the papers ranged from hydraulics of missile guidance servo systems to blow moulding techniques for plastics, and general industrial hydraulics.

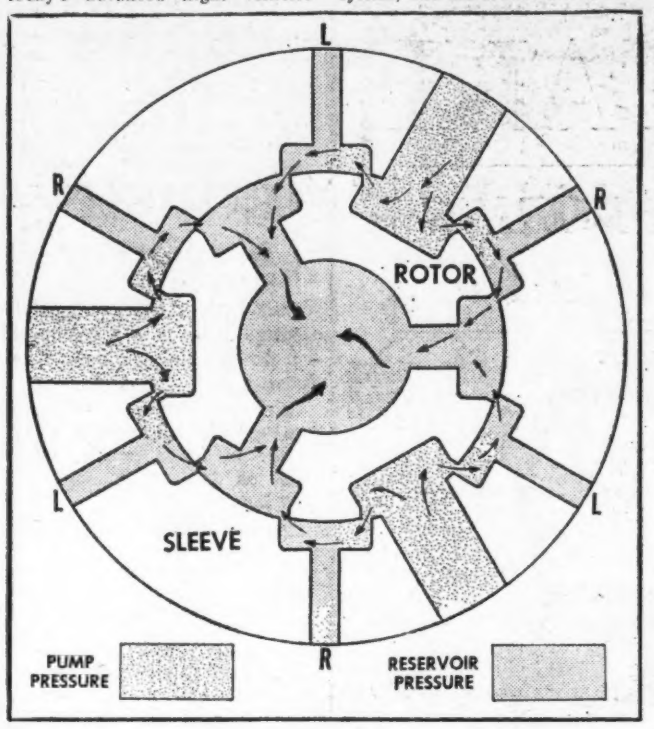
Describing the design of a high temperature hydraulic system, W. E. Mayhew of Republic Aviation gave details of systems operating in difficult environmental conditions.

The high temperatures at which today's advanced flight vehicles operate pose difficult problems to designers of fluid power systems. With the arrival of manned space flight and the need to re-enter the earth's atmosphere after travel through space, these problems of extremely high temperatures become even more formidable.

This paper outlines the present stage of development reached by Republic Aviation Corporation in the design and development of a fluid power system for a hypothetical flight vehicle to operate at extremely high temperatures.

The paper describes various components associated with the system, and the technical advances achieved in design, development and test.

The programme, in brief, consisted of the study, design, development, and fabrication of an aileron control subsystem to operate in an ambient temperature ranging from +20°F to +1,200°F maximum.



Hydraulic servo valve for power steering of automobiles described in a paper by H. E. Hruska, Bendix Corporation.

In the initial phases of the programme, emphasis was placed on the selection of a fluid suitable for the required temperature range of +20°F to +1,000°F since this was the first and most critical problem area to be resolved.

Studies were conducted on fluids that had already undergone extensive laboratory testing such as the silicate esters, diesters, and silicones, as well as those still in the test tube stage.

Republic conducted dynamic tests and evaluations of two ethers and a mixed ether in a miniaturised system at varying pressure levels and at temperatures up to 1,000°F.

Isostatic pressing

These tests showed that the polyphenyl ethers offered considerable promise. It must be borne in mind that this fluid is not suitable in all respects for the required temperature range. Other organic materials have greater thermal stability, for example, but have higher melting points.

Isostatic pressing is a means of compacting powdered materials by direct hydraulic force or high pressure gas on the material and details of this method were given by H. C. Jackson. The powdered material is placed in a rubber or plastic bag or mould, or metal envelope and sealed tight to separate the powder from the liquid or gas. Hydraulic pressure is then applied to the whole surface.

This gives uniform compression and improved homogeneity resulting in equally controlled shrinkage on all surfaces, and produces in many cases a material superior to products formed by other mechanical methods.

Isostatic pressing is accomplished through a system consisting of a pumping system for pressures from 5,000 lb./sq. in. up to 150,000 lb./sq. in., a pressure vessel and tubes, rubber bags or moulds. Some of the items being isostatic pressed are tool bits, boring bars, grinding balls, fountain pen tips, electrodes, magnets, solid fuel slugs, missile nose cones, compressed charges of explosive materials, thermocouple wires and tube insulators.

Materials being improved by compacting are refractory metals, oxides, ceramics, carbides, cermets, plastics, synthetic rubber, super alloys, and solid fuels.

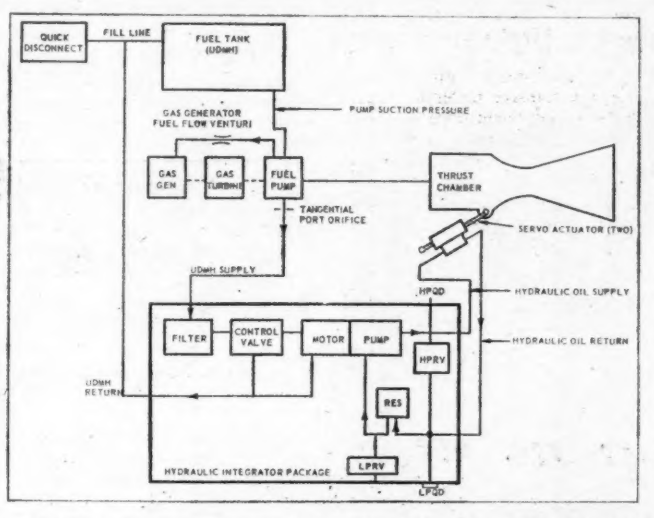
In the dwell time the hydraulic system will make up any pressure drop automatically that may develop because of the compacting of the material.

After the pressure has been reached and the proper dwell time has elapsed, and the system has been depressurised, the closure may then be removed and parts being compacted can be unloaded.

In some cases dimensions can be so controlled that no machining is required.

Liquids used in isostatic pressing can be almost anything that is not dangerous to personnel and as long as there is some lubricating value in the liquid, and in most cases it should be a rust-preventive liquid or have a rust inhibitor added. Some systems are being used that require gas as the pressure medium. This does not involve hydraulic equipment for the compressing, but in turn uses compressed gases as high as 60,000 lb./sq. in.

There are many hydraulic systems operating up to 5,000 lb./sq. in., and a few available for 10,000 lb./sq. in. However, above these pressures the pumping systems are more complicated, but are relatively simple up through 60,000 lb./sq. in.



Missile fuel-hydraulic system block diagram described by D. Youre and R. N. Franzle, of Lockheed.

The reactions of hydraulic fluids and mechanical components in a hydraulic system are so interrelated that knowledge of the fluid action is necessary for a better understanding of the system. This is the basis of a paper presented by R. L. Leslie, Vickers Inc. Since the operation of most hydraulic systems involves the utilisation of fluids at high rates of flow and high pressures with rapid changes in flow and pressure, the dynamic properties of hydraulic fluids are of importance to the designer.

The application of pressure and its rate of application may cause appreciable changes in the characteristic of a fluid. The application of high shear stresses and the rate of application of these stresses may well cause the fluid to react differently than is normally expected.

These differences in reaction are thus manifested in the performance characteristics of the system.

Power Steering

A variable hydraulic servo system for optimum power steering of automobiles was presented by H. E. Hruska, Bendix Corporation. The steering system under consideration has a rotary valve with a piston which is operated by hydraulic pressure and moves a gear sector on the output shaft.

Pressure is directed to one side of the piston or the other by the valve at the input end of the gear. This valve has an inner rotor which is driven directly by the input shaft. An intermediate sleeve between the valve rotor and the housing is keyed to rotate with the steering gear worm.

Initial rotation of the steering wheel causes torque to be transmitted from the input shaft and the valve rotor, through the torsion bar to the hour-glass worm in the gear.

The torsion bar, having a constant rate, is the feedback to the driver. The torque input required at the steering wheel, in other words the manual requirements of the driver, are determined by the amount of wind-up required in the torsion bar for the valve to build up the pressure differential across the piston to meet the output requirements of the gear.

A valve with straight cut-off lands leaves little angular distance of travel between the point of initial pressure build-up and the point where pressures are adequate to negotiate the average driving manoeuvre.

Generally, it has been observed that abrupt changes or high values of slope in the curves of pressure versus valve angle or flow versus valve angle are associated with instability. Also, the higher the boost, the more critical is the valve design. Instability is generally associated with large changes in pressure or flow to the cylinder for small valve travel.

Dynamic properties

As we consider the feedback loop of the servo system, it becomes obvious that the driver receives signals other than those reflected by the force required at the steering wheel. The lateral acceleration of the vehicle is also sensed by the driver and is the limiting factor in determining the amount of steering wheel rotation that can be tolerated for a given vehicle speed.

Pressure effects

The effect of pressure on hydraulic fluids is interrelated in many fluid characteristics. The change in density, or loss of volume of fluid, has long been recognised. However, the rates of change of volume and pressure are also associated with pressure pulsations and acoustical phenomena. Pressure also affects the viscosity of fluids so that viscosity variation with temperature should not be thought of as a line, but rather as a surface with pressure as the third axis.

The increasing use of polymeric substances to thicken and improve the viscosity-temperature relationships of hydraulic fluids introduces the problem of allowing for the lowering of the viscosity of the fluid due to the high rates of shear encountered in hydraulic pumps and motors.

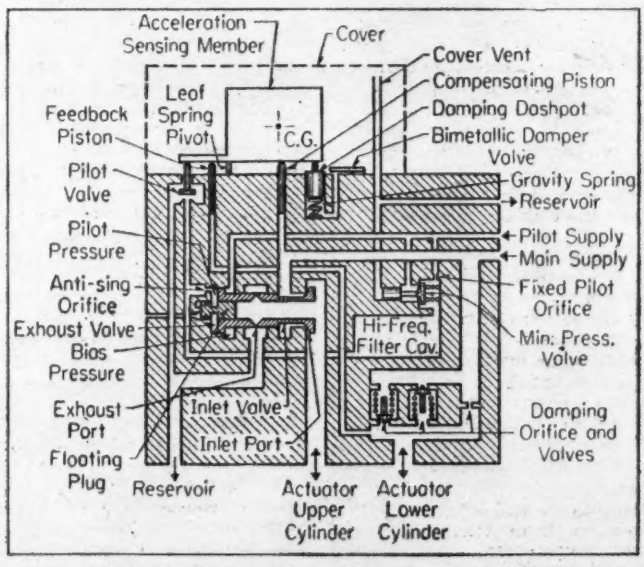
The sudden application of shear force may affect fluid viscosity. When the shear forces are applied to fluids within a very short time span, the fluid will exhibit elastic as well as viscous properties.

While these concepts of fluid reaction are not new, it has only been in recent years that instrumentation techniques have made it possible to measure some of these properties.

Output changes

The compressibility of hydraulic fluids has long been recognised as a significant factor in the performance of hydraulic components and systems. The compression of fluids results in changes in output of pumps and motors and is associated with pressure pulsation problems.

Since the compressibility of hydraulic fluids is relatively small at low temperatures and pressures, the effect of compressibility on simple low-pressure systems is relatively unimportant. However, as hydraulic systems become more sophisticated, are operated at higher pressures and temperatures, and require uprated performance, it becomes important to design more precisely for the performance of the system.



Motor vehicle stabilisation controller described by C. R. Hanna and W. O. Osbon, of Westinghouse. These devices control hydraulic fluid to four actuators which replace the conventional shock absorbers.

Letters to the Editor

THOSE BLUE STREAK BLUES

MAY I express my appreciation of your excellent coverage of developments in the aerospace industry in the United States.

Your headline "Found—a use for Blue Streak!" (November 9 issue) emphasises the rather sad condition of the space industry in this country. We are now committing ourselves to an unrealistic programme of development of a rocket vehicle in conjunction with Europe that will be of little real value should it be operational by its target date of 1965.

By that time, the satellite field will be fully served by proved American vehicles and systems, which we shall necessarily use. It is a consequence of our ignorance of the possibilities of space exploration and exploitation in the past that we are now preoccupied with the supposed necessity for launching our own sateillites, even though the prestige and other aspects of such activities are now much reduced.

Space exploitation from the satellite level onwards is essentially a matter for global concern and co-operation, and it is regrettable that the decision has been taken to proceed with a project that essentially duplicates American work of some years back rather than enter into co-operative arrangements with the Americans of mutual value in the technological field.

There are a vast number of problems to be studied in the comprehensive American space programme, both scientific and technological in character. We should aim at making distinctive contributions to a Western World effort, either by directly augmenting the American programme or by following up our own ideas in booster vehicle design. There is unfortunately little or no sign that the Government and the engineering industry appreciates the vital need for this realistic approach.

S. W. GREENWOOD, M.Eng., A.M.I.Mech.E., A.F.R.Ae.S.

Lexham Gardens Hotel,
112-116 Lexham Gardens,
London, W.8.

More training needed

THERE have been various articles recently published in the National Press drawing attention to the serious shortage of skilled craftsmen in industry today; this specially applies to toolmakers. In view of our coming entry into the Common Market and the intense competition expected I suggest that more can be done in the training of apprentices in the Technical Institutes throughout the country.

The plastic, electrical, and motor industries have created a tremendous demand for moulds, press tools, pressure diecasting dies, and other industries are also using more tools than ever before. Yet hardly any of the Technical Institutes have specialist toolmaking courses.

When an engineering appentice attends a technical school he is given a sound basic training in fitting, turning, milling, etc. I suggest that those apprentices requiring toolmaking training should after a period be given specialist toolmaking training covering:—design and manufacture of plastic moulds, press tools, and pressure diecasting dies. Experience in all three are required by toolmakers today. The course could include new methods which could shorten the training period.

Small firms for many reasons cannot give the apprentice the "wider" toolmaking training that he needs today. Toolmaking training can be organised to produce toolmakers at a faster rate.

E. F. CLAPSON.

Chesterdale,
Montefiore Road,
Hove 4, Sussex.

Britain uses Russian machine for electroslag welding of nuclear pressure vessels

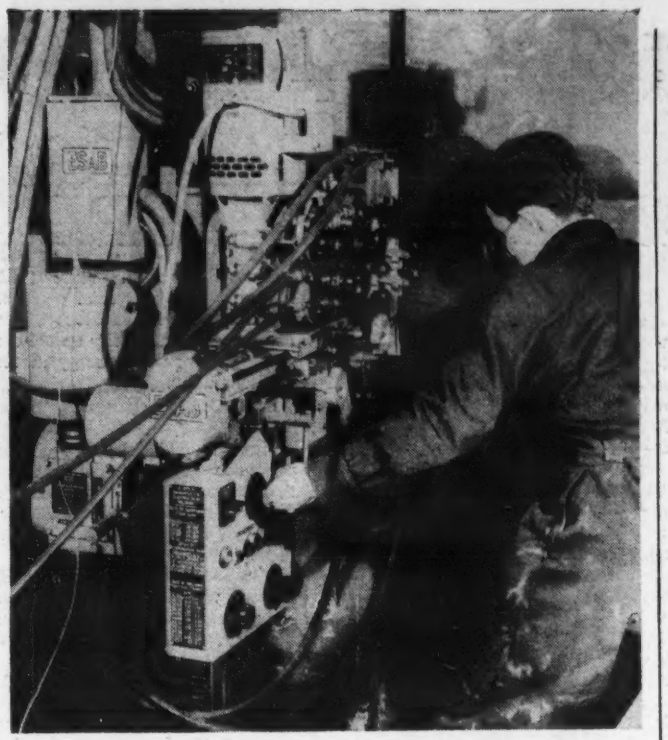
AN electroslag welding machine of Russian manufacture is being used for welding heat exchangers for the Dungeness nuclear power station by Head Wrightson, Teesdale. The application of this method to Class 1 pressure vessels means that several technical problems have been overcome. The shell plates of the heat exchangers are approximately 3in. thick and the work is furnance normalised after the completion of the electroslag welding.

All the welds are subjected to 100 per cent radiography and ultrasonic inspection will be carried out on all welds of plate thicknesses greater than 3½in.

The completed heat exchangers will be 75ft. long by approximately 24ft. inside diameter, and will at a pressure of 295 p.s.i. at a temperature of 420°C.

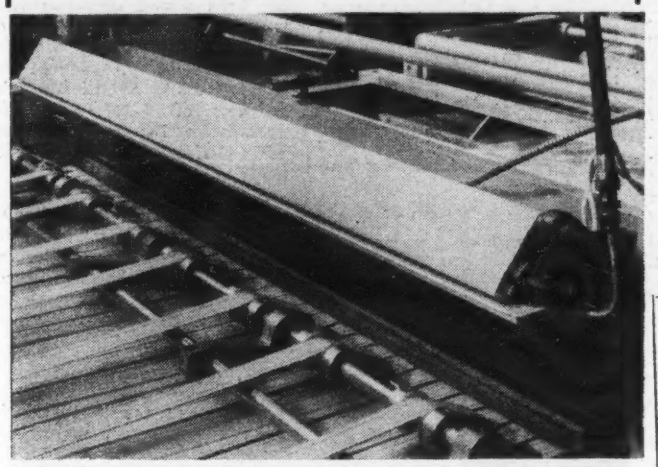
It is now rather more than twelve years since the electroslag welding process was developed in the U.S.S.R. Despite its many apparent advantages in the welding of thick plate, it is only during the past three years that Britain has been showing interest.

Up to the present the only applications of the process in the U.K. have been in the field of general engineering where the welds have not been subjected to the rigorous inspection requirements appertaining to Class I pressure vessels.



The start of an electroslag weld with a Russian machine, in a 3.37in. thick shell plate at the works of Head Wrightson, Teesdale. The plate is part of a heat exchanger for Dungeness Nuclear Power Station.

NEW APPLICATION FOR p.t.f.e. FABRIC



Tygaflor ptfe glass fabric used to heat seal polythene on the Harnden-Schjeldahl bag-making machine. Illustration shows sealing section with sealing knife out of position and the Tygaflor sheath.

AN application for p.t.f.e. glass fabric is on the Harnden-Schjeldahl polythene bag-making machine manufactured by C. A. Harnden, Hyde.

This fabric is used on the heat-sealing unit to prevent the electrically heated sealing knife from making direct contact with the polythene, thus preventing sticking.

The knife is held at a constant temperature of about 200°C. and is covered with a 0.003in. thickness of Tygaflor—a p.t.f.e.—covered glass fabric made by Fothergill & Harvey.

This material allows the transfer of heat from the knife to the polythene and sealing is carried out against a Tygaflor covered rubber pad.

The quick-release properties of this heat-transfer material ensures that the polythene does not stick to the sealing surfaces.

The fabric is made by applying a smooth, uniform and continuous coating of p.t.f.e. to woven glass cloth. Remarkable inertness is claimed against nearly all chemicals, solvents and fuels and in addition the coating stands up to temperatures from −100 to 250°C.

The coated glass has a low moisture absorption, is fungus-proof, and has high abrasion resistance.

Mr. Hare opens safe factories drive

FROM OUR PARLIAMENTARY CORRESPONDENT

A DRIVE to cut down the number of accidents in industry has been launched by the Minister of Labour, Mr. John Hare. The accident figures for 1960, showing a rise on the previous year, were described in Parliament last week as "very disturbing".

Mr. Hare declared: "It is essential that all concerned in industry should review their policy and activities on accident prevention."

To this end he wrote recently to employers associations in a number of industries and last month called and addressed a conference in Newcastle, attended by both sides of the shipbuilding and ship-repairing industry.

* * *

Mr. Hare disclosed that he is shortly to discuss further lines of action with the British Employers' Confederation and the TUC. In doing so he intends to pay particular attention to accidents to young persons and the need for improved training and supervision of new entrants. He pointed out that 65 per cent. of all accidents are caused by "falling, tripping up, and so on," which are probably due to carelessness and lack of safety consciousness among people in industry. "That is the thing we have got to get over," he said.

In a later discussion on the industrial injuries scheme, Mr. R. E. Prentice (Labour, East Ham, N.) said that last year there were more than 190,000 accidents reported in industries covered by the Factories Acts alone.

* * *

The Government's decision to hold-up the building of a nuclear-powered merchant ship while a programme of research to find an economic reactor system for shipping is undertaken, came under criticism, especially from shipyard area MPs from the North-East. It was a double disappointment for Tyneside which recently lost the Cunard liner contract.

Mr. Ernest Marples, the Transport Minister, said that tenders received by his department from industry for a nuclear reactor suitable for installation in a merchant ship had been examined. The conclusion was that while it would certainly be technically feasible to build a nuclear-powered ship now, nuclear propulsion for marine purposes did not offer sufficient economic promise to justify building a merchant ship at the present time.

The Minister of Labour is to make a statement shortly about the future of the Technical and Scientific Register kept by his department. It provides a nation-wide service for placing professionally qualified people in employment.

Casts cut inspection time

CASTS of internal struts and spars surfaces in aircraft are being made of Silcoset by Westland Aircraft to simplify examination of these surfaces.

Before "Silcoset" rubbers were used, this examination was carried out with an internal microscope — a highly skilled operation that took much time.

Faults identified

After curing, the flexible casts can be withdrawn for close inspection. Faults are shown in accurate relief.

Because Silcoset rubbers can be cured at room temperature, they were ideal for this purpose where heat curing was undesirable and where cost of conventional rubber moulding equipment was not justified.

Silcoset rubbers are cured by adding a catalyst and the curing time can be varied to suit the needs of the user.

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Mr. G. W. Harriman

MR. G. W. HARRIMAN TO SUCCEED SIR LEONARD LORD

THE British Motor Corporation announces the appointment of Mr. G. W. Harriman as chairman and managing director in succession to Sir Leonard P. Lord, whose retirement was announced recently.

Mr. Harriman was deputy chairman and managing director under Sir Leonard and he has had a long association with his former chief.

Mr. Harriman began his apprenticeship at the Hotchkiss factory in Coventry which was purchased by Lord Nuffield, who was at that time Mr. W. R. Morris. This factory then became the Morris engine factory, at which Sir Leonard was already making his mark.

☆

Two new divisions have been formed in BSA Group's revised structure. Each has a divisional board and comprises four companies.

Mr. A. J. Burton, who joined the BSA headquarters staff in 1960 as director of manufacturing services, has been appointed managing director of the general engineering division, which comprises BSA Guns, Carbodies Ltd., Monochrome and a new company, BSA (Redditch).

The managing director for the metal components division is **Mr. R. F. K. Belchem,** who has been personal assistant to the group chairman (first Mr. J. Y. Sangster and then Mr. E. Turner) since he joined BSA in 1959.

Other board changes are, **Mr. N. H. Buckley** has been appointed a director of BSA Metal Powders Ltd., **Mr. J. W. Binsted** joins the board of Idoson Motor Cylinder Co. Ltd., and **Mr. P. J. Markham** will be a director of Metal Powders and of Idoson.

Mr. A. J. Burton

Mr. A. J. Burton has been appointed a director of BSA Guns and of Monochrome.

☆

The death has occurred of **Mr. J. Myers,** senior representative for Dielectric Generators in the Electro Heating Group of Research and Control Instruments Ltd.

Mr. Myers has been with the Philips organisation selling high frequency generators since 1952. Before that he was chief engineer of D. M. Davies of Slough. Mr. Myers was an authority on the use of High Frequency energy in the wood industry.

☆

Hawker Siddeley Aviation announce a re-organisation of their astronautics group under the direction of **Mr. G. K. C. Pardoe,** of the de Havilland Aircraft Company.

The team will be led by **Mr. G. Coates,** who is being transferred to de Havillands' from the Hawker Siddeley Advanced Projects Group.

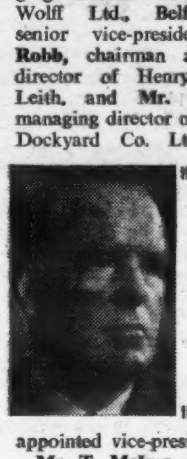
This re-organisation will enable the practical background of a well-known guided weapons team to augment the facilities at the disposal of the Astronautics Group. The company will continue to give active support to the aims and objectives of the British Space Development Company.

☆

At the annual general meeting of the Central Board of the Shipbuilding Employers' Federation, **Mr. R. C. Thompson,** chairman of Joseph L. Thompson and Sons Ltd., Sunderland, was elected president for the coming year. He succeeds **Mr. J. Rannie,** shipyard director of John Brown and Co. (Clydebank) Ltd., Glasgow.

PEOPLE in the NEWS

Dr. D. Rebbeck, deputy managing director of Harland and Wolff Ltd., Belfast, becomes senior vice-president. **Mr. H. Robb,** chairman and managing director of Henry Robb Ltd., Leith, and **Mr. G. Morrison,** managing director of the Greenock Dockyard Co. Ltd. were also



Mr. R. C. Thompson

appointed vice-presidents.

Mr. T. McIver, a director and general manager of Swan, Hunter and Wigham Richardson, Newcastle-on-Tyne, was elected chairman of the Conference and Works board, and **Mr. T. Parnell,** a director and shipyard manager of the Caledon Shipbuilding and Engineering Co. Ltd., Dundee, was elected vice-chairman.

☆

Aircraft - Marine Products (Great Britain) Ltd. announce that **Mr. E. J. Blythe** has been appointed chief product engineer. This is a new appointment and coincides with the substantial expansion of Aircraft-Marine's development and research facilities in Great Britain.

Mr. Blythe has been concerned with the development and production of transmitting valves for the past ten years. In his new appointment he will operate from the Aircraft-Marine head office in London.

Another new Aircraft-Marine appointment is that of **Mr. A. Fowke** who is now in charge of the laboratories. Mr. Fowke worked for eighteen months with John Brown (Special Engineering and Nuclear Developments) Ltd.

☆

Mr. K. A. Smith, who for the past two years has been a director of Firth Cleveland Steel Strip Ltd., of Tipton, has been appointed a director of Firth Cleveland Steel Ltd. and of the associated company J. J. Habershon and Sons Ltd.

Mr. Smith joined the Tipton company in 1949 as a metallurgist and 1955 he was made works manager. In 1959 he became production director.

Mr. Smith is a member of the

Mr. K. A. Smith

Iron and Steel Institute, and of the Institution of Metallurgists.

☆

Metal Industries Ltd. is establishing fourteen regional offices in the United Kingdom to co-ordinate the marketing arrangements of a number of companies within the group.

The new offices will each house under one roof the area sales engineers of Brookhurst Igranic, Lancashire Dynamo and Crypto, Lancashire Dynamo Electronic Products, Lancashire Dynamo Nevelin, Foster Transformers and, in some offices, J. G. Statter.

The following appointments as regional managers are as follows: **Mr. W. H. Soper,** Midlands, Birmingham; **Mr. W. Jones,** Mid-Southern, Bournemouth; **Mr. W. J. Weston,** South-Western, Bristol; **Mr. F. R. Williams,** South Wales, Cardiff; **Mr. W. J. A. Gemmell,** Scotland, Glasgow; **Mr. B. L. Perkins,** Eastern, Ipswich; **Mr. H. R. Renfree,** N. E. Yorkshire, Leeds; **Mr. E. G. Harrison,** Central London, London; **Mr. R. W. Puttock,** S.E. London, London; **Mr. B. G. Scott,** N.W. London, Wembley; **Mr. A. S. Brain,** North Western and North Wales, Manchester; **Mr. F. D. Gough,** Northern, Newcastle; **Mr. F. W. Whiting,** Midlands, Nottingham; **Mr. S. Wood,** S.W. Yorkshire, Sheff

In addition, four indu specialists on an M.I. Gr basis have been appointed: **Mr. R. Morgan,** Steel Indu specialist for the South at Car **Mr. W. A. Worton,** Steel indu specialist for the North, Sheffield; **Mr. F. Nye,** Ma specialist for the South, in L don; and **Mr. K. B. Allan,** Ma specialist for the North, Glasgow.

☆

Mr. W. C. Lange of A-MP corporated, Harrisburg, Ps, U has been elected corporate president and director merchandising. This appointm has been made in order that Lange can co-ordinate activities of A-MP's Dom Sunsidiaries Division, Indus Sales Division and Internati Division.

A-MP Incorporated, USA, is parent company of Airc Marine Products (Great Brit Ltd. Mr. Lange visited Eng in September for the official o ing of the new Aircraft-Ma factory at Port Glasgow, S land.

☆

Changes in the board of Rheostatic company have announced. The chairman, **Mr J. Gartside,** is relinquishing appointment as managing dire of the company owing to gr increased managerial responsi ties within the Elliott-Automa Group as a whole. He will re chairman.

Mr. J. H. Stevens, director the general manager of the pany succeeds Mr. Gartside. **H. C. F. Miller,** who has associated with the company its foundation, has retired health reasons. **Mr. E. O. H feld,** director of Elliott-Auto tion, and **Mr. G. C. Fairbs** director of Elliott Brothers (don) Ltd., have joined the bo

☆

A new sales representative been appointed by Firth C land Steel Ltd., of Rotherh Yorks., to take over responsib for the North-East England territories of the company. H **Mr. R. C. Miller** who will handling the products of the manufacturing companies of Cleveland Steel Ltd.

Mr. Miller has had consider experience in the steel strip dustry and he is familiar both the cold rolling and with hardening and tempering proc associated with this material. Miller will be based at Ho Mills, Rotherham.

COLLEGE GETS LABORATORY

MINERAL DRESSING TECHNIQUES IMPROVED AT SIR JOHN CASS

TO ENABLE students to study basic principles of mineral dressing techniques, the Sir John Cass College, London, has provided a laboratory attached to the Department of Metallurgy.

Much of the equipment has been installed by the Fraser and Chalmers Works of G.E.C. It includes an Armstrong classifier, grinding facilities, a Sherwen test-sieve shaker, a Wilfley No. 13A concentrating table with interchangeable decks riffled for sand and slimes, a Denver jig and a Denver froth flotation cell.

For closed circuit work the Armstrong classifier can be used to return the oversize in the mill discharge for regrinding.

A Rotometer measures water flow through the classifier, thus controlling separation size. The latter has a transparent body to enable students to view the particle separation.

The Sherwen feeder works on the electromagnetic principle and will handle a wide range of materials. Through rheostatic control, feed rate is variable from zero up to about 1 ton an hour.

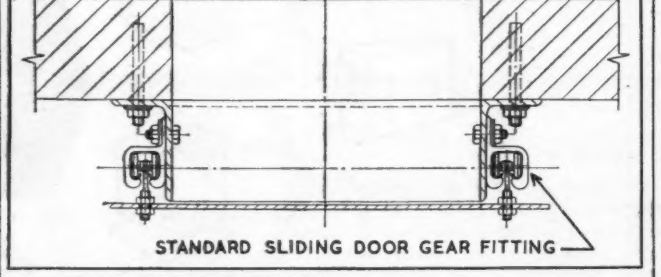
Vibration control

A time switch is fitted to Sherwen test-sieve in addition to the vibration control rheostat. It will take up to twelve 8in. or 10in. diameter sieves.

The Wilfley table is used to concentrate heavy minerals found in sandy material of a size range from about 10 to 200 mesh. Deck slope is adjustable and there is a quick-return mechanism to throw the mineral forward.

The new mineral dressing laboratory at Sir John Cass College. G.E.C. (Engineering) supplied much of the equipment installed.

Suspended gates stop hopper-jam



A RECENT modification to the gates of 12 hoppers at the Swindon laboratories of the United Steel Companies has overcome the problem of sticking due to the accumulation of dust and fines.

Normal guides were removed and the steel plate forming the gate was suspended from two lengths of track supplied by Coburn Engineers of Guildford.

No ledges

This system presents a clean surround to the hopper mouth with no projections or crevices for dust build-up. The plate can be adjusted on the suspension bolts to reduce the gap to a minimum.

Plate control is by means of a roller chain at each side with shaft connection at one end.

U.S. develop 'silent' helicopter

FIRST successful flight of a new gas turbine engine designed specifically to power helicopters was reported this week by The Garrett Corporation, Los Angeles.

This engine propelled a Republic Aviation helicopter in a series of flight tests, including hovering and climbing to over 10,000 feet, as well as measured fuel consumption and sound level surveys.

The helicopter, called the "Lark", was powered by a Model 331 gas turbine. The engine completed a 50-hour unofficial preflight test lab run before it was installed on the Lark.

Test pilot George Reno, commenting on the quietness of the engine, said upon landing after the first flight: "It's the first helicopter I've ever flown where I could carry on a normal conversation while in flight with the doors off the 'copter."

Do it now!

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Coming EVENTS

THIS WEEK

November 13-16
National Maintenance Conference and Exhibition, Central Hall, London

November 13-16
Seventh Annual Conference on Magnetism and Magnetic Materials, Phoenix, Arizona.

November 13-18
Engineering Materials and Design Exhibition, Earls Court, London.
Factory Equipment Exhibition, Earls Court, London.

November 14-December 31
Indian Industries Fair, New Delhi, India.

November 15-17
British Iron and Steel Federation Training Conference, Old Swan Hotel, Harrogate.

November 15-29
Building Exhibition, Olympia, London.

November 16-19
Conference, Scientific Instruments Manufacturers' Association, Grand Hotel, Eastbourne.

November 23
One-day Conference of the British Institute of Management on Efficiency in the Office, Connaught Rooms, London, W.C.1.

November 27-December 1
International Automation Ex tion, New York.

November 27-December 1
Fifth Congress and Internat Automation Exposition, New

December 4-8
College of Production Techno Ashford; Elimination of Paper Course, St. James's Court, Lo

January 3-13, 1962
Eighth National Boat Show, Court, London.

January 8-12, 1962
International Heat Transfer ference, Institution of Mecha Engineers, Westminster, Londo

January 9-11, 1962
Eighth National Symposium Reliability and Quality Co Washington, D.C., 1962.

January 22-25, 1962
National Plant Maintenance Engineering Show, Philadelphia.

January 29-February 2, 1962
Electrical Exposition, New

April 5-8, 1962
Fifth Annual British Motor S Queen Elizabeth Hotel, Mon Canada.

THE FACTORY EQUIPMENT EXHIBITION AT EARLS COURT

Automatic vendors go all out to interest managements

THIS year the manufacturers of automatic vending machines are making an all-out drive to interest factory managements.

One of the largest sections at the Factory Equipment Exhibition at Earls Court this week is devoted to canteen, welfare, and automatic vending products. The show closes on Saturday.

There are machines for selling everything from cigarettes to paper-back books and nylons.

Complete automatic cafeterias are on show and there are many examples of machines delivering tea, coffee, milk, ice cream, rolls, pastries, chocolates and hot and cold snacks.

The sub-division of the exhibition that will attract practical engineers is the workshop machines, tool and equipment section, and there are a number of new developments here that merit study.

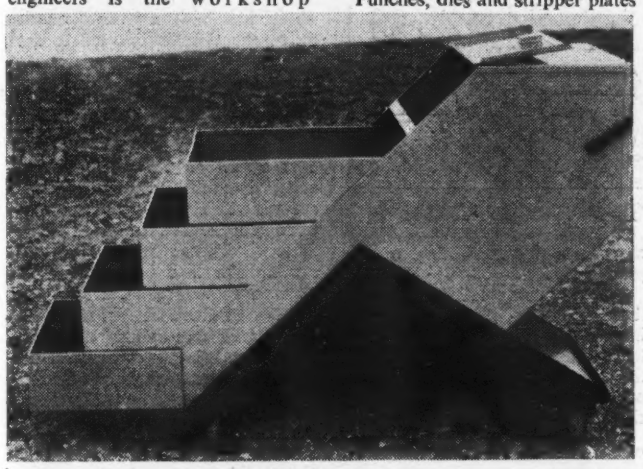
Redman Tools are showing their new Unicentre press tool, which they describe with some justification as "a new approach to short run piercing".

It is to make holes up to 3in. diameter in sheet metal working from marking out only.

Punches, dies and stripper plates can all be changed in seconds and the punches are spring-loaded so that they can be brought down to rest lightly on the work while final adjustments of position are made.

For a relatively large hole the most convenient method of working is often to punch a small diameter hole using a centre-punch mark for positioning.

A finished size punch with a pilot bar is then inserted and the first hole used for accurate location of the larger punch.



Four tool drawers and a lockable compartment are provided in the Toolkart, and roller bearing castors are fitted.

Latest addition to the range of hydraulic tools manufactured by Blackhawk is a compact cable cutter which can deal with copper and aluminium cables up to 2in. in diameter.

60 sec. cuts

The tool will clean-cut a cable of maximum diameter in 60 secs. The cutter is normally operated by a hand pump connected by a flexible line.

The task of carrying a comprehensive kit of tools right up to a job rather than working in one set location could be considerably lightened by the Toolkart, a heavy duty tool trolley mounted on roller bearing castors.

It is to be found on the stand of W. Pinder and Son. Construction is of stove enamelled sheet steel and there are four capacious trays and a lockable compartment.

Measurements are 34in. high, 34¼in. long and 18¼in. wide.

In the handling, storage and partitioning section there are many types of trucks, fork lifts, stackers, pallets and conveyors to be seen—all shapes and sizes of the equipment which has revolutionised the handling of materials and tools in recent years.

Among the simpler devices are retractable shelves made by Bertram Thomas (Engineers).

They can support jigs and fixtures and have been used to store complete car engines. The shelves are mounted in a steel framework and move on rollers.

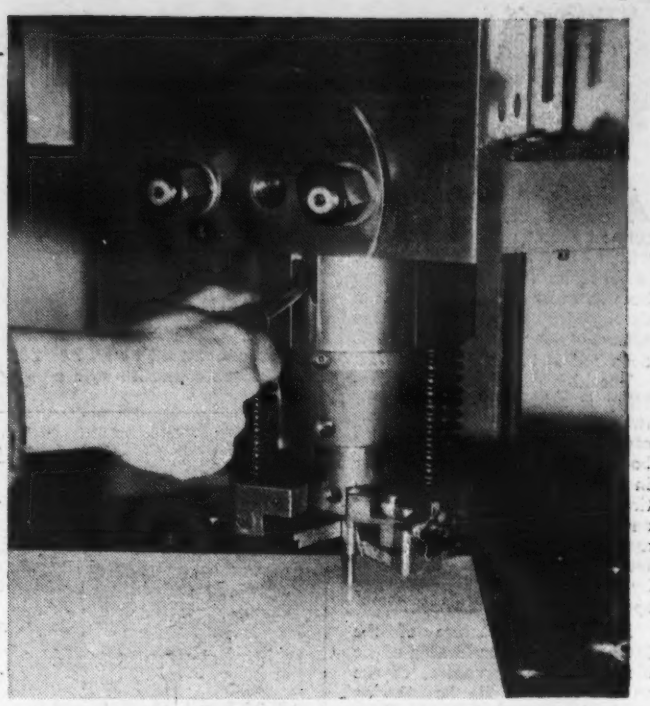
Stops prevent them from being withdrawn too far and heights can be adjusted in 2in. steps.

Racking system

A powered conveyor racking system has been introduced by the Geo. H. Gascoigne Co. for the handling of palletised goods.

The pallets are driven forward by rollers carried on endless chains. If the pallets are brought to rest by stops or by a build-up of pallets in front, the rollers merely revolve harmlessly.

The drive mechanism is reversible and the system lends itself to storage applications as well as the movement of pallets from one point to another. Standard pallets with no modification of any kind are used.



Holes up to 3in. diameter can be produced with the Unicentre press tool. It incorporates a number of features designed to ease short run work and prototype production.

Also on view in the handling section are a new range of H. C. Slingsby aluminium ramps and dock boards for loading trucks and lorries.

They are portable yet can carry weights of up to 1,200lb. Widths between the raised edges are up to 30½in. and various lengths up to 72in. are available as standard.

For the office

Among the office and drawing office equipment exhibits, the stand of the Nig Manufacturing Co. has been laid out to give executives a clear idea of what they will get for their money.

Three typical layouts show what can be achieved for £55, £125, and £155 per man from a range of parallel motion, counterbalance and straight edge drafting machines and seven different systems of plan filing.

Business Aids are showing an electrically driven pencil sharpener which is claimed to give a perfect point in two seconds.

The machine is automatic—merely insert the pencil—and is powered from mains supplies.

A complete range of office furniture, said to be the first ever produced in Stelvetite, plastic coated steel sheeting, can be inspected on the stand of Metal Details, who are also showing filing cabinets with wood Stelvetite.

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. . . to our Private Exhibition of MACHINE TOOLS for TOOLROOM and PRODUCTION which is being held at our London Showrooms in Hester Road, Battersea, S.W.11, from Wednesday 15th until Friday 24th November daily between 9 a.m.–6 p.m. (Closed on Sunday).

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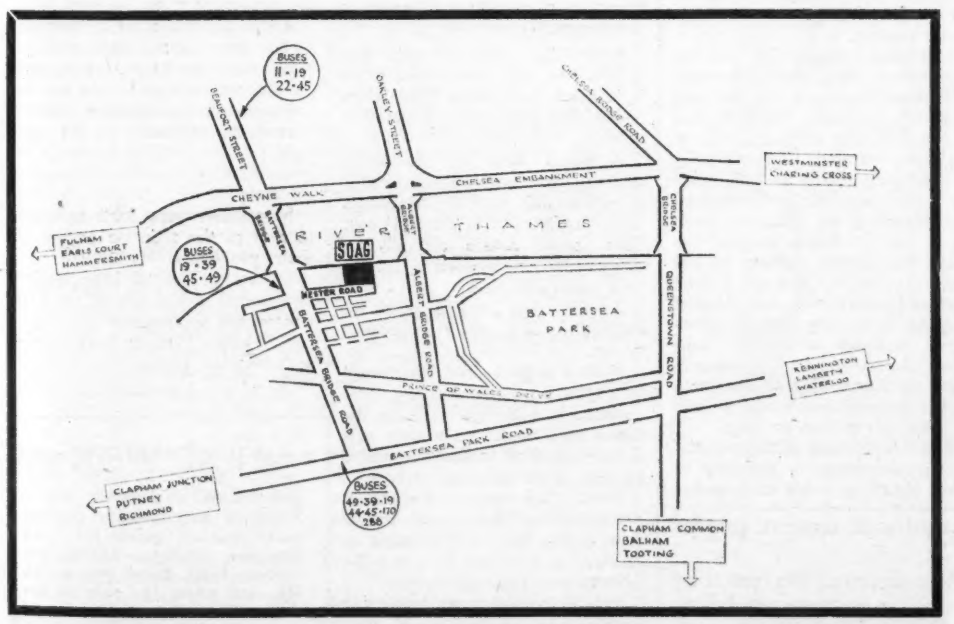

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INDUSTRIAL TRUCK IS ALL-DIRECTIONAL

AN industrial truck of extreme manoeuvrability that can rotate about an axis substantially within its own length, and can also travel along a path at an angle to both its width and length, has been developed by **the Yale and Towne Manufacturing Co., U.S.A.**, and is described in **Patent no. 880,057.**

The high degree of manoeuvrability is achieved by the use of two steering and traction units, each of which can be rotated bodily relative to the truck, either in the same or in opposite directions. Moreover the two steering and traction units can be locked against any steering movement—but the truck can still be steered by controlling the direction and speed of the traction wheels.

A particular feature of the invention is the interlocking of the directional power control of the traction units and the steering mechanism, to effect proper directional drive when the traction units steer in opposite directions.

Fig. 1 shows an end elevation of the truck, with a pair of steering-and-traction units 29, 30, mounted on ball bearings 34 in the traction supporting frame 23 which is pivoted on shaft 25 welded to the main frame of the truck. Each steering and traction unit comprises a motor, gearbox 31, traction transmitting gears 32, and traction wheel 33. The speed and direction of the motors of traction units 29, 30 are controlled respectively by handles 37, 38; they can be controlled together or independently.

The mechanism for controlling the steering rotation of the steering and traction units is shown in Fig. 2. The left-hand steering and traction unit 29 is connected through chain and sprocket direct to the vertical steering shaft 43 to which is keyed the steering wheel 44. The right-hand steering and traction unit 30 is connected to a second vertical shaft 47.

Fixed to the shaft 43 is a gear 55, and similarly to shaft 47, a gear 56. Mounted also within the gear casing 50 are three gears 57, 58, 59, adapted to slide together vertically. The sliding motion of all three is effected by an operating plate 62 controlled by a control and positioning rod 66, itself controlled by handle 68 which is pivoted in the casing. There are three control positions.

In the illustration, the three control gears are in their lowermost position. Gear 57 is in engagement with both gears 55 and 56; gears 59 and 58 are also engaged with gear 55 but not with gear 56, being below that gear. In this configuration, the steering wheel 44 will rotate both steering-and-traction units in the same direction relative to the truck.

If the handle 68 is now moved down to its lowest position, the three control gears 57, 58, 59 are moved to their uppermost position, bringing gear 57 out of engagement with gear 55. Gears 58 and 59 are now engaged with both gears 55 and 56 so that movement of the steering wheel 44 rotates the steering-and-traction units in opposite directions relative to one another.

If steering handle 68 is moved to the central position, all five gears 55, 56, 57, 58 and 59 are in engagement and it is impossible to rotate the steering wheel.

Fig. 3 shows various modes of movement possible with the truck-straight linear motion at I, steering by differential speed control at J, angular linear movement by steering of the steering-and-traction units at K, sideways travel by positioning steering-and-traction units in opposition and reversing traction on one unit, at L; steering while moving sideways at M; and turning in its own length at N.

FIG. 1

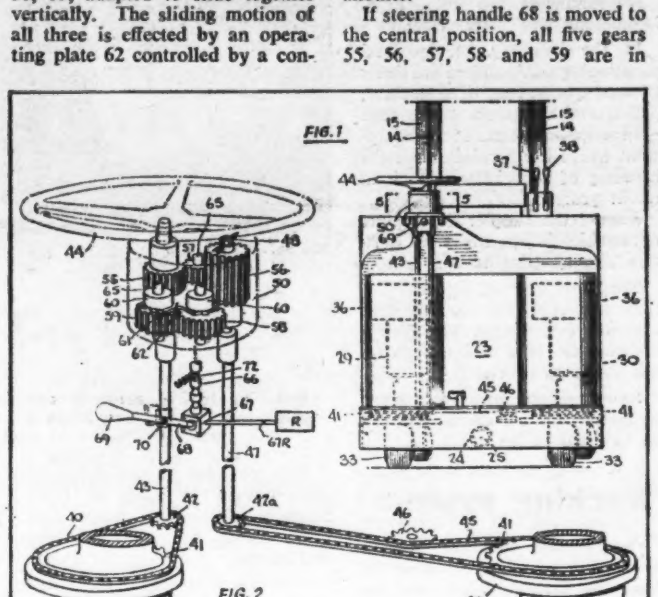
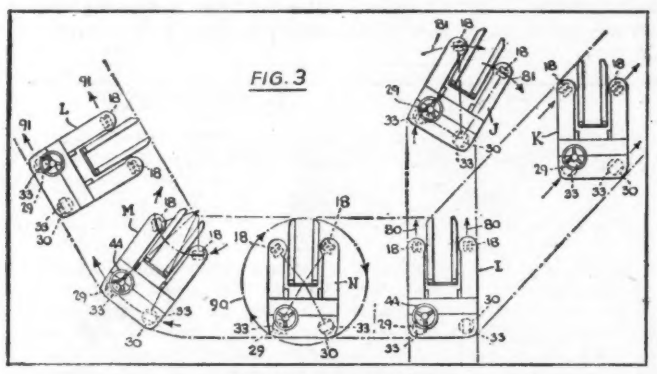


FIG. 2

PATENT No. 880,057

FIG. 3



PATENT No. 880,057

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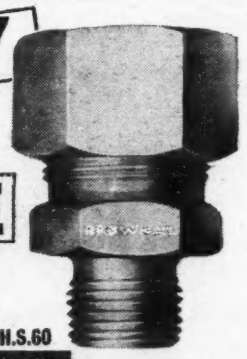

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new PATENTS

SINTERING TECHNIQUE FOR STRIP, ROD, TUBE

AN extrusion method of making bi-metallic or multi-metallic strip, rod or tube starting from powdered materials is described by **Mallory Metallurgical Products Ltd.**, and **John Henry Drew** in **Patent No. 880,583.** The method ensures intimate bonding between the constituent metals, thus minimising any tendency for parting at the interface during subsequent forming operations.

Considering the application of the technique to a bi-metallic element: the first step is the production of a composite billet from the two constituent powdered metals. A preformed rigid spacer member is located firmly in a mould so as to divide the mould into two portions of predetermined relative volume. Each portion of the mould is then filled with a predetermined weight of the appropriate metal powder. The proportions of the two parts of the mould are such that the levels of powders are exactly the same in both. The spacer member is then carefully withdrawn vertically, disturbing the powder as little as possible. Pressure is then applied to the powders to form a compact, which is withdrawn from the mould and sintered at suitable temperature in a protective atmosphere to form a composite billet.

The final step is the extrusion of the billet through a die to form a composite strip, rod or tube in which the constituent metallic layers are intimately bonded through the length.

The essence of the invention is the proportioning and location of the metals forming the composite billet so that, after extrusion, the composite product contains the constituents in the required relative thicknesses and proportions. This is achieved by suitably contouring and dimensioning the spacer member. The Patent describes in detail a simple geometrical construction for determining the contour of the spacer member according to the required relative dimensions of the constituent layers in the final extrusion.

This gives the shape, but not necessarily to the required scale; the dimensions of the spacer, and thus its position in the mould, are determined by calculating the relative cross sectional areas required to contain the appropriate powder charge to give the required final relative cross sectional areas in the extrusion. Again a simple graphical method is used for the proportioning operation.

The process can be applied to multi-layer strip, rod or tube by employing several spacer members shaped and proportioned according to the method outlined in the Patent.

BRACED LIP SEAL USES TIE MEMBERS

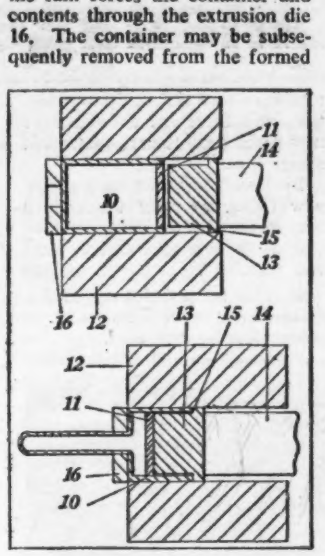
LIPSEALS have been known to unfold under the action of excessive pressure. To prevent this, **the Minister of Aviation** proposes in **Patent No. 881,278** to use tie members bracing the folded lip of the seal to the main wall portion. In one version of the invention, cord-like tie members are spaced at equal intervals around the periphery. In another version, the tie members comprise flexible web-like members secured at one edge to the concave side of the lip.

SINTERED EXTRUSIONS FOR STEEL PARTS

A METHOD for compacting, sintering and extruding rod or tube forms from powdered material is described by **the Chesterfield Tube Co. Ltd.**, in **Patent No. 879,590.** It is particularly suited to the production of components from steels with high boron content.

Powdered material for sintering is inserted into an open-ended cylindrical container 10, one end of which is closed. The open end of the container is then closed by a closure member 11 temporarily secured in position by tack welding. The container is then heated and placed in an extrusion press 12, a pad 13 being inserted between the closure member 11 and the press ram 14. Pressure is then applied by the ram so that the tack welding is broken and the powdered material within the container is compacted. If desired, some pre-compacting may be given to the material before the closure member is put into position.

The temperature of the material in the container is sufficient to effect sintering under the pressure resulting from continued ram movement, causing the powdered material to coalesce into a single mass. Further displacement of the ram will bring the shoulder 15 formed on the pad 13 into engagement with the wall of the container. Thereafter movement of the ram forces the container and contents through the extrusion die 16. The container may be subsequently removed from the formed component by machining or by pickling.



PATENT No. 879,590

For producing tubular articles, the container is provided with an internal tube which has one end located in an aperture formed in the closed end of the container, the other end being tack-welded to the closure member; the powdered material being inserted into the annulus between the tube and the container before the closure member is fitted.

The press ram is provided with a projecting mandrel which enters the tube before the ram pressure is applied to the closure member. During extrusion the mandrel extends through the aperture of the extrusion die so that the component, as extruded, is of tubular form. Both container and tube are extruded with the material and can be subsequently removed by machining or pickling.

PLASTICS-COATING METAL PISTONS

THE method of applying a plastic coating to a metal surface outlined by **Joseph Lucas (Industries) Ltd.** in **Patent No. 881,175** relates particularly to pistons or similar hollow cylindrical components.

The metal surface to be coated is first knurled. The peaks of the pyramidal projection thus formed are flattened by means of a hardened roller under pressure. The piston is then placed on an axle rod and a piece of steel which has been machined to fit inside the skirt is inserted to act as a heat reservior.

After heating to a suitable temperature (330°C in the example cited in the Patent, comprising nylon coating) the piston is rolled over a bed of powdered plastic material until its periphery is coated. The plastic is then sintered (for 20 sec. in the case of nylon). If necessary, a further coating can then be applied and sintered as before, until finally a coating of thickness greater than that finally required is obtained. Subsequently the coated component is turned down on a lathe to give the required uniform coating thickness.

AMERICAN LETTER

Automation must be second to product design

THE word automation has been applied to mechanised equipment ranging from a simple gravity conveyor to complex multi-station transfer machines and, as a result, has many shades of meaning.

In considering automatic or mechanised systems, it is easy to lose sight of a basic and important fundamental—cost.

When the projected unit cost is based on anticipated sales gains it is much less secure than when based on a guaranteed production volume.

A sharp drop in production quantity has much more effect if a substantial capital investment must be absorbed in the total cost This is of course an obvious danger easily recognised by intelligent management.

Another less obvious result of automation is its effect on product design.

With a large capital investment in a specialised machine line, little patience is exhibited with the designer who comes up with a new design unsuited to the automated equipment at hand.

Thus, the new design is evaluated and judged not on its own merits but on the basis of production facilities specially tailored to a previous design.

This is becoming an increasing problem in medium- and low-quantity production plants that are subject to frequent model changes.

Few facets of American industry are immune to change and some are very dynamic.

The design engineer has a basic ability to combine materials and ideas into useful working elements. Any restriction imposed by inflexible production facilities upon this innate capacity, of necessi lessens his value and usefulne to his company.

Production capabilities clear must remain secondary and, some degree, be determined the design of new products.

Management must remembe production facilities are the mea for achieving a design goal.

These goals are set by produ design programmes and must r main so, regardless of the tre to mechanisation.

Production techniques mu always be examined in the co light of their ability to adapt new designs with reasonab economy.

Many managers look to aut mation as the ultimate answer their problems.

In reality, limited investigatio and casual acceptance of the av claims for automation can be and in many instance have been a damnation rather than a salv tion.

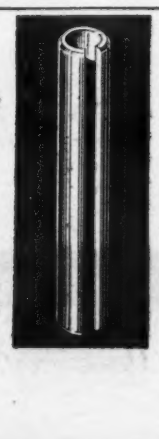
NEXT WEEK

IN Britain, engineering industrialists have already decided that we are going into the Common Market. Behind the waiting faces, minds are working, and under the skin of industry there is a quiet hum of ordered activity.

Next week, Engineering News follows up its series of reports on Common Market countries with a look at Britain.

Engineering News Industrial Editor J. D. F. Perry is visiting the engineering centres of Britain, and week by week he will keep you up-to-date with behind-the-scenes preparations

USE GROVERLOK SPRING TENSION PINS



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EDUCATION and TRAINING

American conscientiousness is shown by their large number of schools

BUSINESS

Youngest profession and the oldest art

THE conscientiousness of the American for business is shown by the large number of institutions that deal with business education throughout the United States. It is interesting to recall the experiences of one who has just returned from the Harvard Business School after studying there for two years. The Harvard School is the oldest out of well over a thousand such schools, since nearly all the universities offer courses in business to both undergraduates and post-graduates.

In his impressions, Mr. Malcolm Harper, a member of John Harper & Co., Willenhall, says, "there is no doubt that everyone in America recognises that business is a legitimate subject for university study".

The problem of tackling the subject which is intensely practical and so dependent on experience is approached realistically at Harvard.

By using the "case method" of study, throughout the two years about 1,000 class sessions were attended; for each of these a "case" was assigned in advance.

Firms co-operate

A written description was given, and often supplemented by visits to the company or meetings with the people concerned in the business.

In some cases the persons from the company being discussed would attend the class *incognito*; after the students had solved the company's problems this person would stand up and give the company's reason for their actions, and give the latest position of the firm.

The students were supposed to prepare each class lesson with a detailed analysis of the case, and to have an answer to the problems posed by it.

Ten-hour day

The large number of cases that were studied throughout the two years meant that a lot of work had to be done out of school. It was usual to spend at least six hours a day preparing in addition to the four hours of classes, which included Saturdays.

The classes were always framed around a case, and there was very little lecturing at any time.

The majority of the professors had had considerable business experience, and during the classes played a relatively passive role; merely calling on students to speak and making occasional short comments in order to bring out the lessons that could be learnt from the case. The classes would be attended by up to 90 students.

At Harvard there were 1,300 students at the Business School: 700 were taken each year, and there were usually about 100 casualties per year — voluntary or otherwise. Out of the total number of students about 12 per cent came from outside the U.S.

Seven subjects

During the first year of the course all the students take the same seven subjects; marketing, accountancy, production, finance, human relations, economics and report writing.

These courses form the basis of all the school's instruction, and at the least give the basic vocabulary of the individual subjects, and a detailed knowledge of the various problems that are likely to arise in each field.

For example, in marketing the basic idea was called "marketing mix". If there is a product to be sold, it is possible to advertise, employ salesmen, encourage wholesalers to sell by giving generous discounts, or to spend no money at all in selling the product but hope that the low price of the article will encourage the buyers themselves to approach the customer.

'Market-mix'

In each case more than one of these methods would be used, and the "mix" would depend on the product and the market that could be reasonably expected.

Throughout the two years many varied problems were set the students. One day the class would be considering whether Pan American Airways should buy a new fleet of airliners, and the following day would be divided on whether Joe's coffee bar should mortgage its building in order to purchase a new espresso machine.

During the second year the only compulsory course is one on business policy, which teaches the student to look at the firm as a whole and to study the external trends and pressures affecting it.

More money

By studying the organisation of a particular firm it searches for the factor which will enable the firm to maintain an independent existence, and examines the future plans and policies.

Many Americans attend the school with the express intention of increasing their earning power, and it would appear that the majority fulfil this.

Government closes two centres

THE Minister of Labour, Mr. John Hare, said in a written reply in the House of Commons last week (Engineering News, November 9, page three) that in the "interests of economical administration" he intended to reduce the number of government training centres by two.

These centres were started last year and now there are 14 dealing with over 3,000 trainees. They are based at Birmingham, Bristol, Cardiff, Enfield, Hillington, Kidbrooke, Leeds, Leicester, Letchworth, Liverpool, Long Eaton, Perivale, Slough, and Waddon.

Near others

The two centres that the Minister wants to close are Long Eaton and Hillington, in each case these centres are near to others which can provide for the local needs. However, none of the first year apprenticeship classes will be curtailed.

The centres aim to give a basic training in a skilled trade: the classes are designed for the person who may need training in some other skill, for example those who have been disabled and are unable to carry on in their old job; or the large number of regular and national servicemen who leave the Forces annually and wish to start work in industry or commerce, but have little previous training that will enable them to get a job immediately without some additional training.

The courses last from six months to a year depending on the amount of training the person has had before entering the centre.

There are also special conversion and refresher courses. The range of courses available covers a wide field from building and engineering to typewriter repairing or shorthand-typing.

The other form of training that is given at the centres comprises the first year of a normal engineering apprenticeship.

The scheme has been approved by the British Employers' Confederation and the Trades Union Congress. Training is offered to boys that have been accepted by firms for apprenticeships, and preference is given to boys from those firms that have found it impracticable to undertake an actual apprentice training scheme or to increase the present number of apprentices, usually due to their small size.

No charge

No charge is made for the training period, but the employers are asked to pay the wages of the boys during the year and to continue the training afterwards under the normal industrial arrangements.

Provision is made for the usual day release at a local technical college, throughout the year, and often additional lectures are organised by the centre.

From last month there were 25 classes operating with 294 students. If the boy has to live a long way from home the Ministry of Labour will undertake to accommodate him in one of its residential training centres.

THE new £260,000 main block of Grey College, Durham has recently been finished, and the complete building was officially opened by Earl Grey, Deputy Lieutenant of Northumberland last month.

The college is built on a hill overlooking the town's ancient castle and cathedral. Accommodation in the block comprises 68 study-bedrooms further rooms for administrative accommodation, common rooms, library, and music rooms.

An unusual feature is four white leather covered doors used at the coronation of Queen Elizabeth II in the annexe to Westminster Abbey, which have been used as effective wall panels in the upper concourse.

The building designed by Thomas Worthington and Sons of Manchester is planned round a quadrangle with the main block projecting to the north.

The main contractors were Holland and Hannan and Cubitts.

SCOTTISH FIRMS SPONSOR SCHEME

THE Scottish Mechanical Engineers' Training Association (SMETA) has been formed to undertake co-operative training for six member firms: John Dalglish and Sons, Davy and United Engineering, Lang - Gisholt Engineering Co., Mirrlees Watson Co., Murray and Paterson, and Scottish Machine Tool Co.

Training will be carried out over a two-year post graduate period and aims at membership of the Institution of Mechanical Engineers as a logical completion of the process of training.

The programme involves initial training, to be done in part or whole during university or college vacations, covering all the basic groundwork.

Thereafter the trainees will go on advanced aspects including design and development, research, estimating, purchasing, costing, selling, organisation, administration, and management.

The trainee will have opportunity during the period of education to sample work within the varied units concerned.

The scheme has some of the hallmarks of the earlier Scottish Electrical Training Scheme (SETS), which has been such a success in electrical engineering.

It fulfils much the same function and uses much the same techniques, but is concerned with only a small part of the total industry which is an inevitable necessity in any such scheme.

Sponsors

The six firms sponsoring the scheme represent a considerable variety of skills and activities, and will be able to provide their graduate trainees with a full pattern of work.

Machine tools are strongly featured although the scheme is by no means a machine tool scheme.

Scope for enlarging on early developments has been demonstrated in the SETS schemes where a few other firms have joined in after the scheme was launched.

The value of that scheme has been equally demonstrated, in the verdict of the people who are paying the bills for the training of the graduates whom they will ultimately employ.

Organising secretary of the scheme is Dr. J. C. Morrison, 126 Cleveden Road, Glasgow W.2.

TRAVEL SCHOLARSHIP

TWO scholarships of £250 each are to be offered annually by the Council of the Building Centre to selected persons who will undertake to travel together to a foreign country.

The aim will be to study the same subject that they are used to in this country, and it is hoped to encourage the study of building materials and equipment and of building processes used in foreign countries.

It is intended that they should not be away for less than a month, and within six months of their return should submit a report. If it is considered suitable the Building Centre will arrange for its publication.

The scholarships are eligible to qualified persons, and preference will be given to those who are associate members of a recognised Institution.

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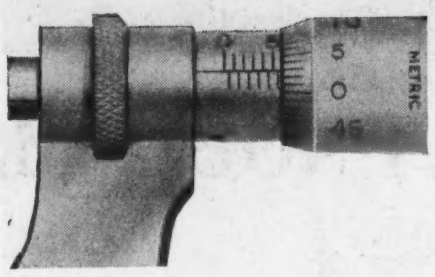
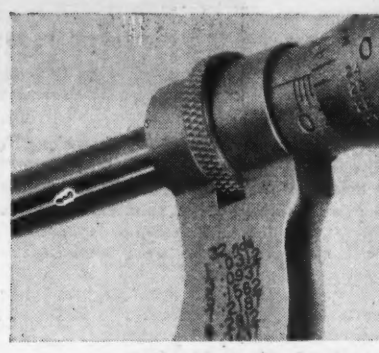


Should Britain go metric?



A committee of the British Association under Sir Hugh Beaver, working in co-operation with the Association of British Chambers of Commerce, carried out an inquiry into the costs and implications of this country adopting the metric system. Group Captain Edwin Shipley acted as Engineer Technical Officer to the committee, but this article puts forward his own opinions.

by GROUP CAPTAIN EDWIN SHIPLEY
M.A., A.M.I.Mech.E., A.F.R.Ae.S., R.A.F. (Retd.)

SOME ten years ago a Board of Trade committee under Sir Edward Hodgson, appointed to consider weights and measures legislation for this country, rendered its report, though little action has been taken yet.

This earlier committee exceeded its terms of reference by recommending that Britain should adopt the metric system, but that this should be preceded by agreement with the Commonwealth and the U.S. for a simultaneous change and the decimalisation of our coinage.

The coinage question has become more topical; it has been debated in the Lords and the world trend shows that this country must come to a decision shortly if it is not to be left behind as the only major trading nation still using a non-decimal system.

In this country there is a tendency to think that we are also left behind in not adopting the metric system, perhaps because all our neighbours (except the Irish Free State) are metric countries.

This question becomes pertinent at the moment due to current discussions on free trade and the Common Market.

From the title of the B.A. committee it might appear that it was a pressure group to encourage the adoption of the metric system, but this was not so.

High costs

The purpose of the committee was to find the costs and implications of a change by this country. It should be unnecessary for any inquiry into the relative merits of the British and the metric systems.

Undoubtedly, if we were to start afresh we would think of something better than the existing British system, most likely adopting the metric in view of its established position in the world.

Our inquiry did show that there was almost universal approval of the metric system as basically better, but it also indicated that the costs and difficulties of this country changing over would be very great indeed.

What we must remember is that as a trading nation we work on small margins. We sell overseas when our prices are lower, or the quality of goods superior to our competitors.

If we were to put ourselves at a disadvantage by the tremendous upheaval that a complete change to the metric system would involve, costs of production cannot but rise.

Halfway?

We might quite easily price ourselves out of many markets where our competitors are already close behind us.

Many people consider if we adopt decimal coinage we should be half way to the metric system.

Even the Hodgson Report suggested this, but our inquiry reminded us that the first country to adopt decimal coinage was the U.S., and this country is an even stronger supporter of the British system of weights and measures than we are ourselves.

Admittedly, they use the short ton and few other units between that and pounds, but there are anomalies in that the Fahrenheit temperature scale is practically universal, and they still use statute miles (and m.p.h.) for their internal aviation.

Our inquiry showed that 65 per cent of our respondents thought it unwise for this country to consider a change without the agreement of the Commonwealth and the States to do likewise.

We also found that there is surprisingly little interest in the metric system in the States and most of the Commonwealth.

For instance, our children are brought up to know both systems but the metric system is not taught in American schools.

Admittedly, to generalise on the "Commonwealth" is not quite correct because only a few years ago India decided not only to decimalise her coinage, but to adopt the metric system as well. We also found that no country had adopted the metric system except after a considerable political upheaval such as the French and Russian Revolutions or independence for India.

With the American thoroughness in engineering methods, and their concentration on keeping production costs down, it is somewhat surprising that they do not appear to value the metric system.

Inquiries have been carried out in the States and we received a report by Roy Trowbridge, "An Automotive Viewpoint on Measurement Systems", the result of one of these in the General Motors organisation.

Unenthusiastic

He reported that the use of two systems in the world caused little difficulty in the States. There was no enthusiasm for a change and they were quite certain that the costs would be prohibitive.

I think we can be assured that if an organisation of this size in the States takes this view, the smaller engineering concerns are not likely to make a change on their own.

If there are two systems in existence, the logical development is to adopt the one which is best established or which has the greater merits. But, if you are going to make a change on a merit basis this must be sufficiently clear and advantageous to convince the majority.

One of the things our industry did show was that though a larger number of countries in the world claimed to be metric, our biggest customers from the trading point of view were in the non-metric camp.

From the point of view of engineering production the bias also seemed in favour of our present system. Perhaps I should give a few examples to support this.

Due to the very large production in the States, statistics showed that more than two-thirds of the world's producion of motor vehicles were in non-metric units.

Resistance to change

Out of the world's 3,400 international airline aircraft only 108 had originated outside the U.S. and the British Commonwealth, and even most of these had British or American engines.

The aviation industry is established on non-metric units, and though there has been considerable pressure in the International Air Transport Association from the numerically stronger metric countries to use metric units internationally, they have had to face an important block who were just not interested in changing.

The fact that this block made or owned most of the aircraft easily accounts for the stalemate. Though, in this country, we use kilograms for aircraft loading, this is about as far as metrics have got.

Distances in nautical miles, heights in feet, speeds in knots, etc., are practically universal in international aviation. So much so that an airline pilot of a metric country to become qualified internationally has, against his better judgment, to educate himself to the British system.

Even in such an old-established industry as shipbuilding we found the British system was well to the fore. A reply from one of the largest ship repairing organisations in the world at Amsterdam indicated that there was little enthusiasm for going completely metric even there as the British system was so well established in world-wide industry.

The oil industry has been veloped mainly by Amer organisations all over the w This industry is based on A ican sizes (i.e. in British u and this extends even into metric countries.

Searching for possible a ment between the two syst we came to the conclusion the question of units of meas ment was not as important as had been led to believe.

We trade with metric and metric countries without n difficulty. After all, the engineer, or perhaps we sh say the successful engineering cern, makes its products to its customers.

This may imply that British concerns manufactur metric units, but there are very many. It seems to be n more important that stand should be agreed internatio rather than that the compon should be measured in the s units.

The American petroleum dustry standards are acce world-wide in that industry, in the metric countries they m measure them in metric units

Between two stool

Similarly, among the comm items in this country spar plugs and tyre valves have al been to metric standards. difficulty in this country has that we often fall between stools. If our standards do agree with the American, we faced with either adopting t to agree with the largest pro tion in the world, or going m to agree with the numeri larger number of countries.

An example of this is adoption of the American un threads some years ao. Even Americans admitted we ha better series of threads in British B.S.F. and Whitworth, it was quite hopeless expec American industry to adopt t

Now, the unified thread is coming established all over world even in the metric count We endeavoured to find s information on the world's duction of threads, and it s that here metric standards fighting a rearguard action ag the unified thread except in very small sizes.

The Hodgson Committee sidered that there was a ce inevitability about the m system in this country. Thi true, but only in certain indust and general engineering is so not one of those concerned.

Customers decide

What it really boils down that as much as we would lik change, we cannot do so wit the agreement of our most portant customers.

But if we join the Com Market, and trade with t countries exceeded that with Commonwealth and the States might be forced to change.

This, in the initial stages change-over, would be at expense and benefit our c petitors more than ourselves.

Eventually we should reap benefit of the simpler co-ordin metric system, but it might ten or more years to recover f the upheaval.

Details given of development in photo-elasticity techniques

DETAILS of latest research methods in two- and three-dimensional photo-elastic stress analysis were given last Friday by J. West and F. S. Lynam of the Pametrada Research Station.

The information was given in a paper presented at a meeting of the N.E. Coast Institution of Engineers and Shipbuilders, held at Bolbec Hall, Newcastle upon Tyne, and is of interest to the engineering designer engaged in complex stressing problems.

It is well known that many machine elements and structural members are of such a shape that the maximum stresses existing in the member cannot be calculated by the elementary basic formulae of mechanics.

Basically there are two techniques. Two-dimensional investigations, in which a transparent plastic model is made from sheet, loaded in appropriate fashion, and viewed in polarized light.

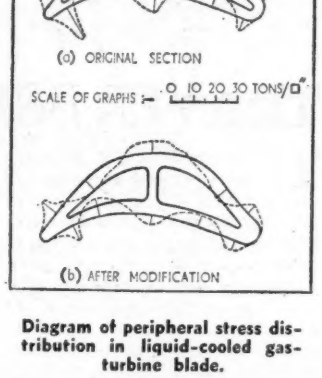


Diagram of peripheral stress distribution in liquid-cooled gas-turbine blade.

Deformations, stresses and their optical effects are representative of, and proportional to, the corresponding stresses in the plane of the slice in the prototype.

The second basic technique is that of stress freezing, which is the most widely used of many techniques for determining the three-dimensional distribution of stresses in a body.

In this technique the stresses incurred under load are locked or "frozen in" by warming the loaded model, and cooling again with the load still applied.

The model may then be sliced without disturbing the distribution of stress, and each slice inspected in polarised light.

Optical gauge

One of the newest methods in photo-elasticity is that of the reflection technique. This is perhaps best described as an optical strain gauge.

In this method a thin sheet of photo-elastic material, such as Araldite, is stuck to the polished surface of the component under test, after which it is cut to the same shape as the metal component.

On loading, the component is strained and the thin sheet of plastic with it, which on viewing in polarised light by reflection from the metal below it, exhibits fringes indicative of the strain conditions at the surface of the metal.

Within the elastic limit of the metal concerned this is, of course, proportional to the stress existing. Within the plastic range, if a true stress-strain relationship is known for the strain measured, the stress can again be calculated.

A calibration is necessary to relate stresses (in the elastic range) to the fringe orders visible in polarised light, by applying a sheet of the same photo-elastic material to a simple model, made from the same metal as the prototype.

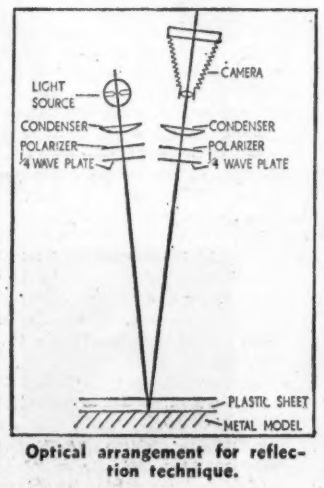
This technique is obviously applicable to any material to which a reflective surface can be applied.

Stresses in graphite have, in fact, been measured at Pametrada by polishing the graphite and applying a reflecting layer of aluminium evaporated on to it *in vacuo*.

Practical example

The work done at Pametrada on a model of a liquid-cooled gas-turbine blade is a good example of this technique. The actual liquid-cooled blade is filled with sodium - potassium alloy together with helium gas to allow for thermal expansion of the liquid metal.

Thus the internal pressure on the blade is composed of a constant part due to the pressure of the gas and a variable part due to centrifugal force.



Optical arrangement for reflection technique.

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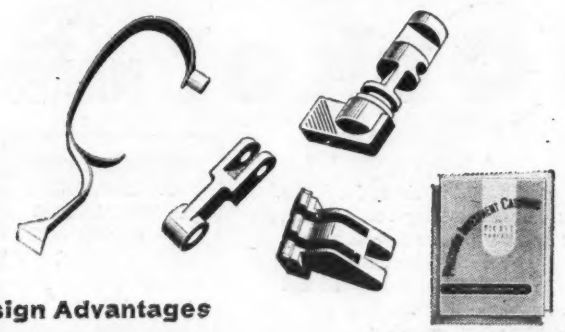

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Sir William Penney, deputy chairman of the United Kingdom Atomic Energy Authority, opens the second Engineering Materials and Design Conference which is running concurrently with the E. M. and D. Exhibition at Earls Court.

ATOM POWER POSES MATERIALS PROBLEMS

Sir William Penney calls for co-operation within industry

RECOGNITION of the importance of materials throughout the country cannot be over-emphasised. This was said by Sir William Penney, deputy chairman of the U.K. Atomic Energy Authority, opening the Second Engineering Materials and Design Conference at Earls Court on Monday.

Sir William said design of the next generation of atomic power reactors is posing severe materials problems.

He hoped that materials now being developed for nuclear reactors would be valuable to other branches of industry, although these tend to use specialised materials.

Exhibitions 'sensible'

Conferences and exhibitions such as these are "sensible", he said, because they help to promote interest.

The Conference which closes tomorrow is running concurrently with the second Engineering Materials and Design Exhibition, and the Factory Equipment Exhibition. Both close on Saturday.

Design Problems with Bluebird by K. W. Norris and L. H. Norris, of Norris Bros., was the first paper to be read at the conference.

This paper was topical particularly in view of the proposed attempt on the land speed record next year, in Australia.

The authors outlined the three phases of development of Bluebird starting from 1955.

Body shape was designed for zero lift throughout the speed range and compared favourably with the Railton Mobile Special. The body is of "egg box" design with main beams in sandwich construction, having inserts for suspension.

The car uses a Bristol Siddeley gas turbine with normal and hot-end drive. Problems had to be overcome to duct the gases around the rear transmission, and to protect the bonded main beams.

Other points outlined by the author covered tyres, brakes and steering control.

To aid the driver, instruments are displayed on a collimated windscreen. This places them at eye level.

Composite Structures, by B. R. Noton of the Aeronautical Research Institute of Sweden, reviews in today's sessions one of the most interesting forms of construction available.

Sandwich construction, where core and covers are adhesive bonded and a large variety of materials can be used, offer the designer many advantages.

High stresses

By suitable combinations of the core and cover materials it is possible to satisfy mechanical and physical requirements that cannot be met by single materials.

He points out that designing structural elements which are stable at high stresses is particularly difficult for low loading intensities.

The most satisfactory method to improve the stability is to increase the cross-sectional area.

Several methods are outlined — two plates with a stiffening web or corrugated plates between; plates with integral or separate stiffening extrusions; and sandwich panels where two plates are held apart and stabilised over the whole area.

In the commercial field, sandwich panels are normally joined by adhesives. For some complicated applications in aircraft and guided missiles, brazed and welded systems are used.

The paper covers some of the principal advantages to be gained by this construction and in particular mentions an example of how the properties of thin sheet can be fully utilised.

A 1 mm. thick sheet of aluminium which normally buckles at low stresses can be supported so that compressive stresses in the region of 85,400 lb./sq. in. can be recorded. Similar improvements are obtained with shear stresses and stiffness.

SIR WILLIAM PENNEY

Cores are manufactured from such materials as Balsa wood, and cellular cellulose - acetate. Various forms of honeycomb type are made from aluminium foil, plastic impregnated glass fibre, cotton and paper.

Various types of core materials together with their applications are given together with some design formulae for sandwich construction.

Investment castings

Some Properties, Applications and Potentialities of Investment Castings, is the title of a paper by L. S. Taylor, chief metallurgist of G. L. Willan, given yesterday.

The author outlines some of the advantages and limitations of the process. The major advantage is the wide selection of alloys suitable for forming in this manner.

Further advantages of investment casting are accuracy, surface finish and intricacy. Various methods are available for producing intricate parts such as wax patterns, where parts are assembled to produce a pattern which could not be made from one die.

Alternatively, a water-soluble wax core may be placed in the wax ejection die and pattern wax injected around this.

Less machining

Dissolving the water soluble core produces an intricate wax ready for assembly on riser bars without further work.

One of the limiting factors the author mentions is the size range currently available. Small parts are made, up to 1,300 castings being made in one mould, but castings of over 15 lb. are exceptional.

Two new developments mentioned are the ceramic shell mould, which enables much larger castings to be made, and vacuum casting which is being extensively used for rotating blades and nozzle guide vanes in aircraft gas turbines.

AROUND THE STANDS AT THE EXHIBITION

Taper roller bearings solve heavy handling difficulties

INTERESTING items at the Engineering Materials and Design Exhibition which opened at Earls Court on Monday included bearing assemblies by Priestman Brothers, which solve design problems of mounting and slewing heavy structures.

Priestman's of Hull are exhibiting self locating, pre-loaded taper roller bearings.

Crossed axes of alternate rollers enable bearings to resist loads in all directions. Precision ground tapered rollers, combined with specially formed and hardened roller paths, offer greater specific load capacity than a ball bearing of equal diameter.

Morganite Carbon are showing a wide range of carbon engineering components. A special feature is a revolving centrepiece on which are sectioned mechanisms illustrating some of the many applications of carbon.

These include a Lucas aircraft fuel pump fitted with carbon bearings and seals; a cut-away example of a small single stage oil-free air compressor; a gate-valve for cabin heating use in the English Electric "Canberra"; carbon sealing rings for carbon dioxide with 0.0008in. deep machined grooves.

Sintered products

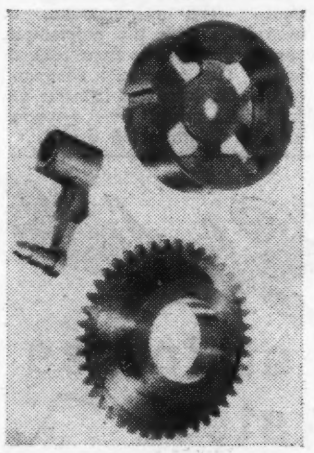
Four member companies of the Sheepbridge Engineering Group will be displaying their exhibits.

The growing popularity of sintered products for machine and structural parts is reflected, says a spokesman, in that approximately four million sintered parts are despatched each month from their works.

These parts are supplied to the domestic, textile, electrical toy, automobile industries and others. It is estimated that most cars produced in Britain contain approximately 40 sintered metal parts of ferrous and non-ferrous metals.

In the aircraft industry a porus sintered mesh, Porosint Rigimesh, is used in the distribution of deicing fluid on the leading edges of aircraft.

Another application is its use in boundary layer control — a technique of vital and increasing importance to aerodynamicists.



These sintered metal parts displayed by Machine Products Ltd. are typical examples of powder metallurgy applied to the production of machine members to be seen at the exhibition.

The introduction of bi-metal techniques to the manufacture of centrifugally cast tubes, cylinders and rolls makes possible the economic utilisation of special metals, such as, the lining of special mild steel alloy tubes with stainless steel for the handling of corrosive liquids.

Bi-metal castings and long length centrifugally cast tubes are displayed by Sheepbridge Alloy Castings together with examples of continuously cast phosphor bronze or iron bar.

Both bronze and iron rods are in heavy demand for automatic lathe production of components. Risk of internal flaws has been eliminated by this method of die casting.

Cooper & Co. (Birmingham), are displaying specially designed all-wool filter discs in varying thicknesses for filtering oil.

Bearing design

Design data on air-lubricated bearings are featured by the National Engineering Laboratory (NEL).

Extensive design data, based on experiments at NEL, are available for both journal and slider bearings lubricated with air, over a wide range of operating conditions.

Two types of air-lubricated bearings have been investigated at NEL; externally pressurised bearings in which air from a compressor is admitted to the bearing clearances through a number of small holes; and self-acting bearings in which air is drawn into the bearing by rotation of the shaft.

In self-acting air-lubricated bearings an air-film pressure is generated automatically by relative motion of bearing surfaces. Rotary type journal and thrust bearings can be designed.

In principle physical arrangement of self-acting air bearings is simple, but since there is no boundary lubrication it is essential to choose correct materials so that starting and stopping wear is reduced as far as possible.

Hawley Products are exhibiting a range of moulded fibre items for domestic and industrial applications. Moulded fibre combines flexibility and resistance to impact with a weight less than one-eight of steel or brass; tensile strengths can be made to vary from 2,000 to 7,000 lb./sq. in.

Translucent roof domes and water-proofing compounds and building panels by Galt Glass Laminates show uses of reinforced plastics.

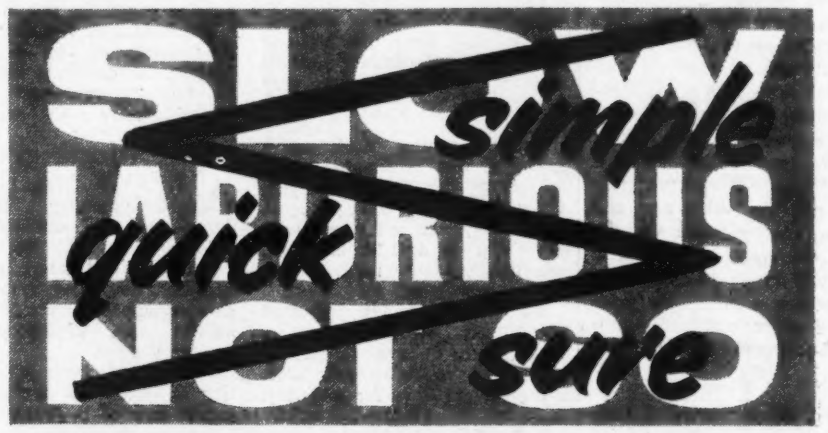
Pitch coatings

United Steel Companies are drawing attention to development in coal tar pitch which has traditionally been used for road surfacing, mastic jointing and inexpensive protective coatings.

Pitch impregnated fibre pipes suitable for drainage and effluent handling are now available in a wide range of sizes and selected examples are shown.

Pitch/epoxy coating systems are being used in increasing quantities on chemical plant and in other environments where special corrosion problems exist. Pitch/epoxy based non-skid industrial floorings are also shown.

A development still in the laboratory stage is the incorporation of pitch into rigid polyurethane foams which have wide potential uses in insulation, lagging and buoyancy chambers.



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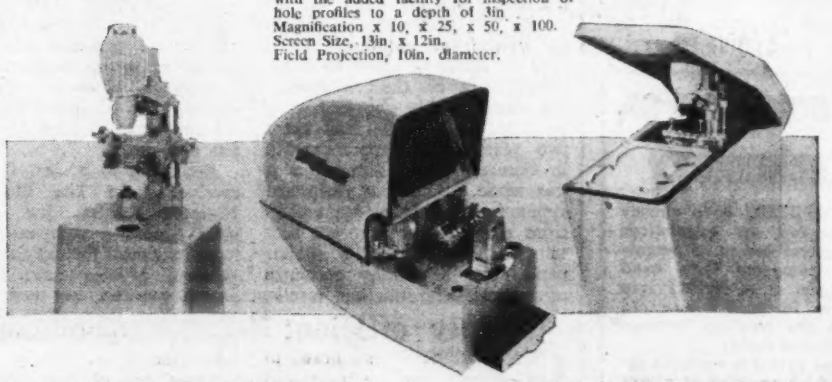
Have you received full details of Heston's comparators? These industrial inspection instruments are designed and made with thought and care—to enable you to achieve high production rates of fine limit small parts.

The REVELATION: A combined epidiascope and profile projector that is used for high definition profile and surface projection with the added facility for inspection of hole profiles to a depth of 3in. Magnification x 10, x 25, x 50, x 100. Screen Size, 13in. x 12in. Field Projection, 10in. diameter.



The HELISCOPE: Thread-forms, gears, tool forms and small parts can be checked rapidly on the work-bench by this direct projection comparator. Magnification x 10, x 25, x 50. Field Projection, 7.5in. diameter.

The VERTEX: A reflex version of the Heliscope, but with added projection power and an etched glass screen or high accuracy protractor screen. Magnification x 10, x 25, x 50. Screen Size, 12in. x 11in. Field Projection, 10in. diameter.

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Write to:—HESTON AIRCRAFT AND ASSOCIATED ENGINEERS LIMITED, HESTON AIRPORT, HOUNSLOW, MIDDX. Tel.: HAYes 3844. A MEMBER OF THE HESTON GROUP

ENGINEERING NEWS

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Thursday, November 16, 1961

THE APPEAL OF FACTS

REMARKABLE growth of the Consumer's Association is the highlight of the 4th Annual report to members. With a membership of about 250,000 this young organisation, is obviously meeting a crying need —the factual reporting of product quality.

There are few activities in this over-commercialised world that are not carried on for either money or power. The success of the C.A. must be due to the instant recognition and appreciation of fact-finding investigations which are unaffected by commercialism or politics.

★

What can we learn from this?

Very simply, the fact that plain truth has an inherent appeal, which is unmatched by all the publicity and blah that plagues us in our professional and private lives.

British engineering companies are notoriously bad at putting over their products to the press and the world at large. But recently we came across a number of cases where firms have made exaggerated claims, presumably in an attempt to keep up with American firms who are inclined to overdress their shop-windows.

This is greatly to be deplored. We have, even today, in Britain a reputation for integrity, a quality of priceless value and one which we must preserve with the utmost determination. This is not merely sentimental rambling because integrity is an asset which is understood and appreciated by buyers of all nations.

★

In his well publicised address last week to the Institute of Directors, Mr. S. P. Chambers, Chairman of Imperial Chemical Industries, expressed great confidence in British Industry. We certainly agree with him so far as the engineering industries are concerned, but let us not sell our souls for a "mess of pottage" in order to get quick results. The future of the industry lies well beyond the next balance sheet.

Tomorrow's technology

COMPUTERS have already speeded up calculations by several orders of magnitude compared with hand methods. A further leap forward in speed is expected when the cryotron becomes a practical reality.

This device is a minute relay which operates at a very low temperature (3-4 degrees above absolute zero) and it has a very short delay time, of the order of 10 micro sec., which opens up new possibilities for increasing the storage speed of data.

But, as pointed out recently by Dr. R. Hamming of the Bell Telephone Laboratories, if man is to be able to deal effectively with these enormous changes, a new philosophy for the future man - machine combination will have to be created.

An Engineer's DIARY

Students should get their hands dirty

A YOUNG man who gets an engineering degree and at the same time is capable of using his hands in model-making and machining has put years behind him in experience.

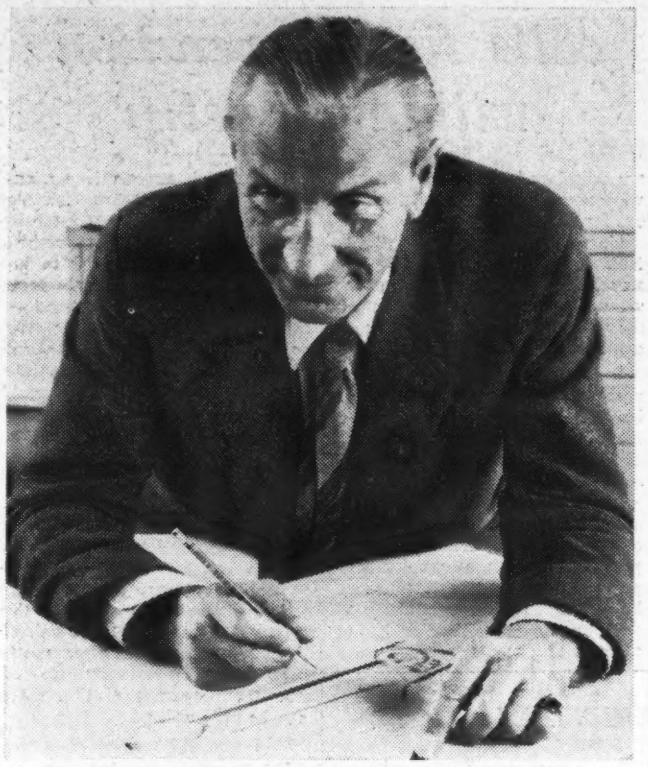
This is the opinion of Mr. Alec Issigonis who has been appointed Technical Director of B.M.C. His appointment to the board of the Austin Motor Co. has also been announced.

Mr. Issigonis can substantiate his remark since in his earlier days, while still a draughtsman, he built himself a lightweight racing car, aided by his life-long friend, Mr. George Dowson.

Although started in 1933, he was not able to use it until after the war, but the satisfaction its creation afforded is borne out by the fact that he still has it. I saw him driving it in a demonstration at Oulton Park earlier this year.

Such early practical efforts undoubtedly helped to develop his natural talents and he soon found himself concerned in research on suspensions for Morris cars.

Mr. Issigonis cannot pinpoint the birth of the Minor. All he knows is that the firm let him get down to it seriously in 1945 from the doodlings in his sketch pads.



Alec Issigonis, designer of the Mini-Minor and now technical director of B.M.C.

Sketching ability

He feels that the habit of sketching is essential in order to communicate ideas to others and considers that academic students are of little value unless they have learnt to get their hands dirty.

Doing practical work as a hobby as well as learning is his advice to the young engineer. Calculations only take you part of the way, the rest comes with experience—as does the important qualification of understanding human behaviour.

To maintain his practical ability Mr. Issigonis somehow finds time to build model railway engines on the dining room table, using the gas stove for soldering.

Young knowledge

THE workings of a complex modern Continental multi-spindle automatic lathe were being ably explained to me by a young engineer from Coventry last week.

My guess was that he could not have long finished his apprenticeship. As this was a recently imported machine into the U.K. and had been on the market in its country of origin for only a few months, I asked how he came to know so much about it in so short a time.

I was agreeably surprised when he told me that he had spent two years of his apprenticeship in Germany at the firm where it was made. Under a reciprocal apprenticeship scheme, apprentices from the German firm are sent to this country for a similar period and a healthy exchange of technical information results.

Cleanly efficient

CLEANLINESS is next to Godliness we are told and certainly it is usually a sign of efficiency on industrial premises.

New paint and adequate lighting are not everything, however. Too many managements still cling to the institutional drab of dark brown walls with radiators in black.

It is refreshing to hear that the Rootes Group are not going to tolerate dingy working conditions at the new plant at Linwood in Renfrewshire where they will be producing their new small car.

They have hired Mr. John Siddeley, one of Britain's leading consultant designers, to advise on interior decor for the factory.

Mr. Siddeley's grandfather was the founder of the Armstrong-Siddeley car company, but this is his first "commission" in the motor industry.

Ambitious plans

ALTHOUGH the Machine Tool Industry Research Association was established in Manchester only about ten months ago, and the present staff of seven assembled under their director, Mr. A. E. De Barr, four months ago, it has already ambitious plans.

"I hope that once the association is established in its fundamental role of a clearing house for technical information it will open its laboratories in the Manchester area," said Mr. De Barr. "The weakness of the present arrangement is that people are not always available at the right time to do the particular work required. With our own facilities the association would be able to attract people from other fields."

Dear Sir

TO what extent are an employee's personal problems a matter of proper concern to his employer? How far should a company go in providing counselling for employees on off-the-job problems?

According to a report I have received from The Bureau of National Affairs, Inc. (BNA), most American companies today have concluded that an employee's personal problems are management's business, at least to the extent that they affect the employee's work, attitude or behaviour.

Three out of four companies are reported to have a programme of some kind to help employees solve their personal problems—on the job, off the job or both.

Some 22 per cent of companies have no counselling service as such, but supervisors or personnel may sometimes help employees with their problems.

I wonder what the corresponding figures for British companies would be.

This reminds me of a tricky problem put to the personnel officer of my old company. He was visited by the wife of a machine-shop worker and asked for advice on how to persuade her husband to take a bath occasionally!

Personally I'll stick to engineering.

John Heywood

SOVIET ENGINEERING

by our own correspondent

Drive to automate electroplating

RECENT issues of the journal Mekhanizatsiya i Avtomatizatsiya Proizvodstvo (The Mechanisation and Automation of Production), the publication of the State Committee for Automation and Machine Building of the USSR, reveal a definite effort to mechanise and so far as possible automate the electroplating shops of the large industrial plants.

At the present time according to Engineers Ya. a. Dvoirin and I. A. Korovkin the electroplating shops are technologically the most backward in the engineering industry. According to these engineers in such shops manual processes, low labour productivity and severe working conditions currently predominate.

In Leningrad, the Economic Regional Council together with the Scientific Research Project-Design Institute for the Technology of Machine Construction have launched a drive to reconstruct the existing shops and build new ones using the latest engineering methods.

* * *

Two new automatic units—the TGA and the UTGPA—designed by the above mentioned research institute are being increasingly used. The former unit is programme controlled and is used to coat items with zinc. It consists of two automatic manipulators, baths for treating and coating, and holders for distributing the items. The manipulators, in accordance with the programme, convey the holders from bath to bath. The operator's command to transfer, raise and immerse are fed from a control panel equipped with a programming device.

The UTGPA unit is used fo nickel, copper and tin plating an is equipped with remote control; in other respects it is similar t the TGA already described.

A more highly developed auto matic unit, the AG-16PU, wa demonstrated a few months ag at an exhibition of the achieve ments of the Leningrad Economi Region. This is a multi-process programme controlled, electro plating system which can be use for nickel, copper, zinc, cadmium silver, etc. The programme con trol system effectively automate all the operations apart fron loading.

* * *

A call for the more extensiv use of isotopes in Soviet industry is made by the chairman of th State Committee for the Utilisa tion of Atomic Energy, V. S Emel'yanov, in the October issu of Atomnaya Energiya. Not tha he is entirely dissatisfied with the present position; it is merely tha he feels it wrong that only a tenth part of the stable and radioactive isotopes known to science are currently being used industrially.

The record for Soviet industry in this matter appears to be fairly good; more than 300 radioactive and stable isotopes are at the present time being produced.

The Kuznets Combine and the Stalinsk metallurgical plant are currently investigating by means of isotopes the flow of a metal during the rolling process. The method involves creating radio active zones in the metal ingot by introducing into the casting mould radioactive isotopes at various stages of crystallisation of the metal.

'REBORE' FOR THIRTY MILE PIPELINE

Travelling machine applies lining of cement mortar

THIRTY miles of 54in. piping in the aqueduct system which carries Manchester's water supply from Lake Thirlmere is being relined.

The aqueduct has been in continuous use since 1894 and Mowlem-Centriline of London have the job of cleaning the pipe and relining with cement mortar.

The process developed by Mowlem Centriline consists of two operations, firstly rust, tuberculation and old coatings are removed by a hydraulic cleaning tool.

This is pushed through the piping by water pressure. Long distances can be treated in this manner.

Lining machine

Cement mortar is then applied to the bore of the pipe by a lining machine, which travels through the pipe. Mortar is applied centrifugally from a revolving dispenser followed by slowly rotating trowels to complete the surface treatment.

The volume of mortar dispensed is constant and thickness is controlled by the rate of travel.

Feeder trucks supply the lining machine with mortar from access points in the pipe line. These are at distances of up to 2,000 feet apart at which the power supply generator and cement bulk are sited.

Mortar thickness of the Thirlmere pipe lining will be 7/16in.

This system is used for pipes between 16 and 144in. diameter. For pipes of smaller diameter, down to 4in., the lining machine is remotely controlled from access points about 700 feet apart.

Mortar is supplied by flexible pipe line and applied centrifugally, no trowels are used.

Epoxy resins can be applied by this process to form linings for pipes carrying sewage and industrial wastes. Centriline resin lining consist of pure epoxy resins extended with fillers such as sharp silica sand, and a number of formulations are available.

Centriline lining machine completing section of pipe on a similar project undertaken for the Birmingham Corporation Water Department. Seventeen miles of 42in. diameter pipe were cleaned to remove internal incrustations and lined with cement mortar to a thickness of ½in.

FABRICS: POSITIVE FEED

FUNDAMENTAL research on fabric geometry is likely to have a most important and far-reaching effect on the art of knitting.

HATRA, the Hosiery and Allied Trades Research Association, has recently demonstrated how a system known as "positive feed" can be applied to different kinds of knitting machines.

Positive feed is the supply of a controlled amount of yarn to a knitting machine for each revolution or movement and this eliminates knitting variations, and results in less wastage of manpower and materials.

Fewer rejects

There are benefits, too, for the consumer. More consistent quality of knitted garments gives better appearance, less risk of shrinkage and more regular sizes.

The main advantages, however, are in manufacturing as a result of smoother throughputs, fewer rejects, and easier sampling methods.

The principle of positive feed can be applied to existing machines and incorporated in new designs.

In each case the mechanism is designed to feed a pre-determined amount of yarn to the needles for each revolution of the machine.

Basically the yarn is fed to the machine by rollers which are mechanically linked to the machine and because of this the length of yarn per course, or row, remains constant whatever the speed of the machine.

Electric 'rev' counter

AN engine revolution indicator which requires no direct electrical connection to, or interference with, an engine ignition system, has been developed by Smith's Motor Accessory Division, London, N.W.2.

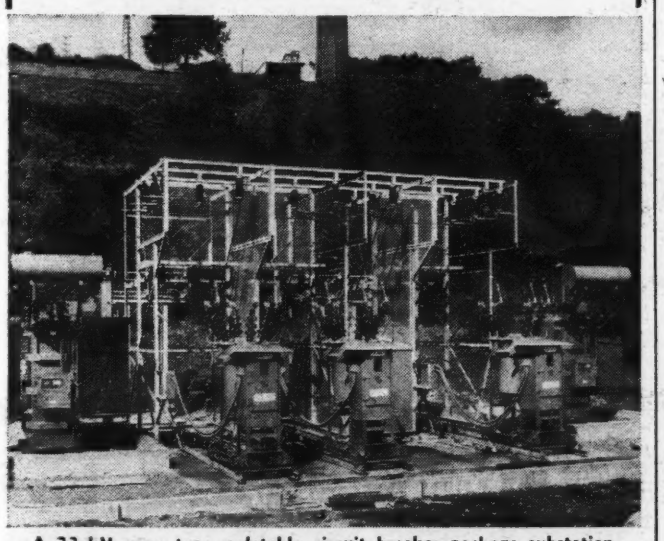
Installation is achieved by looping the battery feed cable, which runs between the ignition switch and coil, through an iron bridge projecting from the rear of the instrument case. This forms the primary side of a current or "triggering" transformer.

Triggers transistor

As this winding is in series with the primary of the ignition coil, when the contact breaker closes, the ignition coil current passes through the primary of this transformer thereby energising its core.

The engine spark triggers a transistor which allows a second transistor to be switched on for a fixed time period thereby allowing current to flow from the battery to the movement controlling the instrument pointer.

WELSH SUBSTATION CLOSES A GAP



A 33-kV open type isolatable circuit breaker package substation, recently developed by South Wales Switchgear and erected at Windsor Colliery in South Wales. It incorporates a built in control room, behind one of the circuit breakers shown in horizontally withdrawn position.

A NEW open-type substation which fills the gap between orthodox open-type substations covering a large area of ground, and ultra compact metalclad package substations, has been evolved by South Wales Switchgear.

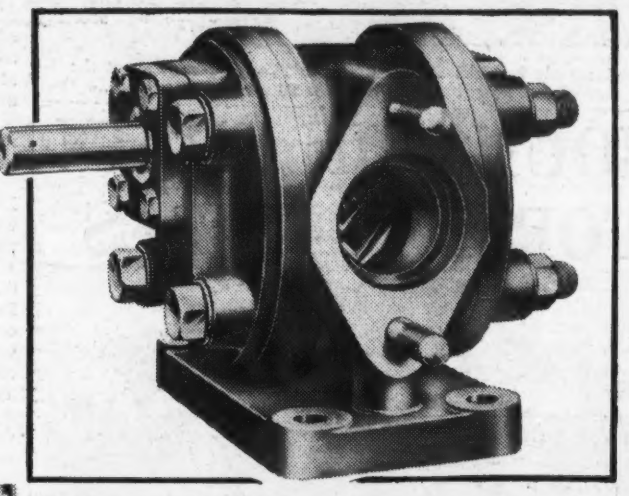
They have designed a 33-kV open type isolatable circuit breaker package substation to meet the demands of customers to whom space and economy are important. The new substation is particularly suitable for rural applications where the smaller type of 33-kV gear is needed.

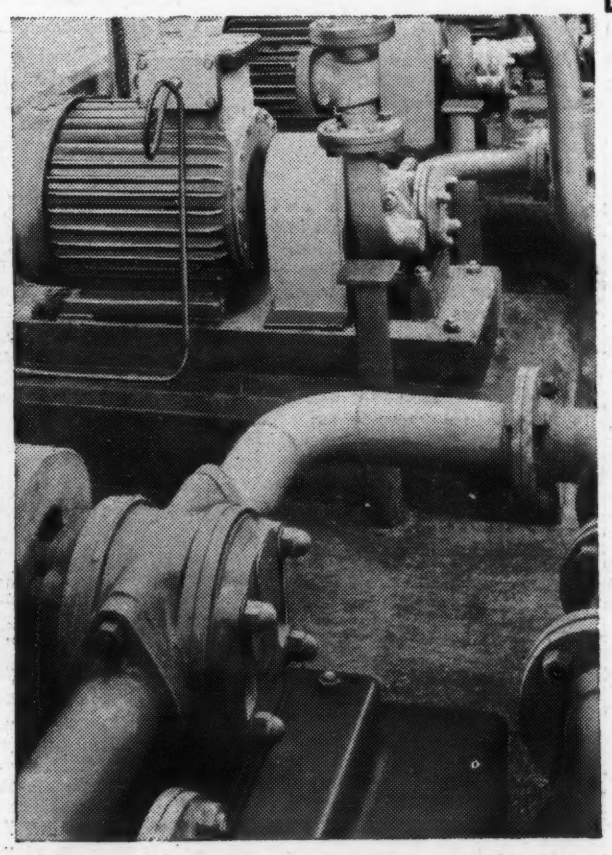
By carrying out much of the assembly at the factory and transporting the prefabricated units to the site, a very high speed of installation is obtained.

Orthodox open-type oil circuit breakers are used, adapted with wheels on rails to give horizontal isolation. This eliminates the usual isolating switches on either side of the breaker to give isolating facilities for maintenance work and achieves a considerable saving in cost and space.

In spite of the low cost it has been found possible, as in the case of the metalclad versions, to incorporate a built-in control room, which in this case is in the run of the switchboard and is housed in the space created by the overhead busbar crossover section for the bus sectionalising arrangement.

When smooth pre-determined flow is essential..





..specify David Brown

ROLOID

gear pumps

The characteristics of Roloid Gear Pumps make them particularly suitable for low pressure, high delivery of any form of liquid with lubricating properties. The rate of flow can be pre-determined to a remarkably fine degree, due to the high, constant efficiency, and the pump maintains its performance throughout its long life Factors contributing towards this high efficiency are teeth that are accurately cut and meshed across the full face of the gear, and roller-bearing mounted rotors. But, of course, you expect top standards from a gear pump made by David Brown—the acknowledged experts in gearing!

Roloid Gear Pumps are made in a range of sizes for deliveries of up to 600 gallons per minute, and at pressures of up to 300 p.s.i. If your needs come within these limits, consult David Brown!

DAVID BROWN

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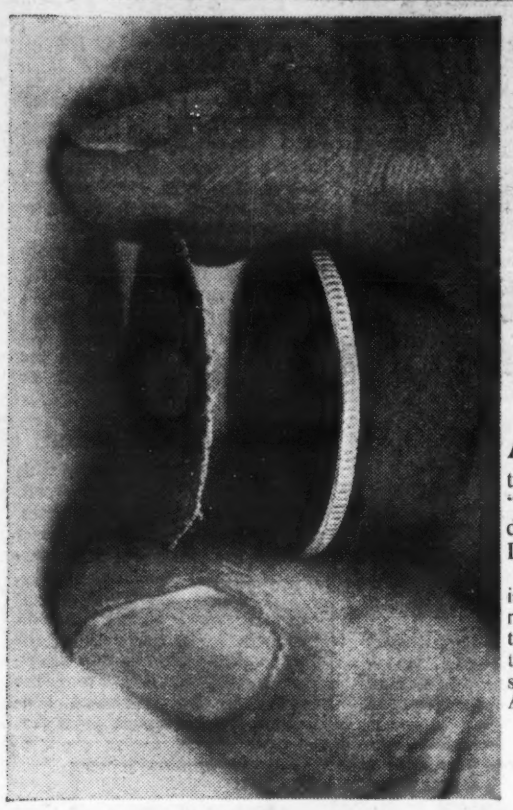
.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....



The inorganic fuel cell compared with a 25-cent piece (about the size of a shilling). It is capable of 90 per cent efficiency.

Illinois research foundation announce 'breakthrough' development

INORGANIC FUEL CELL FOR SPACE

Energy-to-weight ratio is unusually high

CHICAGO

A FUEL CELL which can supply electrical power in the high temperature and radiation environment of outer space, described as a "breakthrough" development, has been produced by the Armour Research Foundation of Illinois Institute of Technology.

Using hydrogen and oxygen for fuel, the cell is composed of an inorganic ion-exchanging membrane which operates at higher temperatures than the organic types now in use, according to the co-inventors of the device, Dr. J. Bregman, supervisor of physical chemistry research, and Dr. A. Dravnieks, ARF scientific advisor.

Stability drops off

The stability of organic membranes drops off sharply at 70°C while increased power can be attained at 100°C with the inorganic material.

The inorganic cell is also more resistant to radiation of a nuclear or cosmic origin.

The device offers an unusually high energy-to-weight ratio, whereby efficiencies are almost unlimited.

Explaining the significance of the development, Bregman and Dravnieks pointed out that inorganic materials do not require water to maintain stability, thus resulting in a lighter cell for space applications.

Foundation scientists have produced experimental cells which have produced 0.95 volts on open circuit.

Greater power

Again the inorganic membrane is superior for power, being capable of attaining up to 100 amp/sq. ft. The organic cell can attain only 35 amp/sq. ft.

Hydrogen causes a reaction on one side of the membrane which gives off electrons; oxygen on the second side creates a void in electrons. When hydrogen ions travelling through the membrane complete the circuit, a flow of electrons takes place from the anode to the cathode, thus completing the electrochemical reaction.

With any number of the water-type fuel cells arranged in series, sufficient voltages may be derived to supply the necessary power for satellite communications, telemetry devices in space, and for operation of equipments during future manned landings on the moon and other planets.

MOUNTAIN TRAIN FOR THE ANDES

LIMA

SPECIALLY - EQUIPPED diesel - electric locomotives manufactured by Alco Products Inc., U.S.A., are being introduced on the Southern Railway of Peru's mainline which winds its way from the Pacific shore up the slopes of the Andes to an altitude of 14,666 ft.

The locomotives are Alco's new model DL-543, which is a 12-cylinder, 2,150 h.p. unit with six traction motors.

To get maximum safe power during the climb a special device has been incorporated into the governor of the locomotive's diesel engine.

The device progressively reduces the amount of fuel injected into the engine so that it never exceeds in quantity the amount that can be burned effectively with the available air.

The total power loss at the highest altitude is less than 15 per cent of the power at sea level.

An extra air-brake system is incorporated for added safety.

Nylon bond developed

LONG ISLAND

A MATERIAL for bonding nylon to nylon surfaces has been introduced by Radiation Applications, Inc., Long Island City, N.Y.

The adhesive is called Raiseal 5002.

Because it is a thermosetting resin, the bond's heat stability is excellent at temperatures up to and above the softening points of most plastics.

Tensile shears are 400 lb/sq.in. after a four-hour cure and 192 lb/sq. in. after two hours at 250° F; peel strength is 11 lb./in. after a two hour cure at 250° F.

The adhesive demonstrates good alkaline resistance.

The material is also finding broad application in the bonding of nylon to most metal and plastic surfaces.

A TRANSMISSION PROBLEM ?
consult the
TRANSMISSION SPECIALISTS
Self-Changing Gears Ltd.
LYTHALLS LANE · COVENTRY · ENGLAND
MANUFACTURERS OF TRANSMISSIONS FOR
ROAD · RAIL · MARINE
INDUSTRIAL APPLICATIONS

Wind tunnel motor

BONN

THE largest four-pole, three-phase, slip-ring motor yet built is now being installed at Gottingen for the new wind tunnel belonging to the W. German "Aerodynamische Versuchsanstalt."

The motor has a rated power output of 12,000 kW at 5.4 kV and can be run at an overload of 15,000 kW for 20 minutes from cold.

Its speed can be varied from 1,482 rev/min., at constant torque to half this figure.

In order to meet an additional requirement, that the motor should produce half its rated load at half speed, 6,000kW must be removed as heat from the liquid starting set, which is designed to take 13,000 litres of soda solution.

The total weight of the motor is 42 tons, the rotor weighing 15 tons.

WINDSCREEN WASHER FEEDS WATER ALONG WIPER BLADE

PARIS

FRENCH motorists are now able to buy a new type of windscreen washer, the "Synchro-laveur", which directs water along the wiper blades themselves instead of in a jet against the windscreen.

The water is supplied under low pressure by an electro-magnetic pump whose action is synchronized with the movement of the blades, the flattened nozzle being hidden behind the windscreen-wiper mounting.

Two holes in the nozzle produce a flow of water on the inside of the arc described by the wiper blades.

Totally immersed

The pump consists basically of a solenoid with plunger piston, in a cast-metal body which is encapsulated in a plastics casing. The whole unit is immersed vertically in the liquid reservoir.

The device is controlled by means of a two-position push-button.

The jet of water is synchronised with the movement of the wiper blade so that it is unnecessary to operate the blade itself by a separate manual control.

Explosives forming

WILMINGTON, Del.

FORMING metal with explosives is a production process which has found several applications recently, particularly in the aircraft and missile industries.

E.I. du Pont de Nemours & Co., one of the pioneers of this process, are also working on hardening metals by explosive charges.

The technique is already employed for hardening components used in railroad points.

Du Pont have now reached the stage in explosion forming where they are able to offer a standard range of materials and equipment, including detonating fuse, sheet explosive and line wave generators.

One of the major advantages claimed for the process is that manufacturers are able to shape large parts with mobile equipment.

Aircraft costs are cut

NEW YORK

MILLING plant to be installed at the Republic Aviation Corporation in Farmingdale is part of a programme aimed at cutting a million dollars off the costs of each F-105D U.S.A.F. fighter-bomber.

The 180,000 dollar plant which will produce high strength aluminium posts for the F-105D consists of ten tanks—each 4ft. by 14ft., and 8ft. deep—a special flow-coating area for masking the work, and a curing oven.

Engineers say the new process will make possible previously impracticable lightweight designs.

The amount of metal to be removed is controlled by the length of time a part is immersed in a special chemical solution, and areas not to be removed are protected by baked-on masking.

Various depth cuts can be made at one time with no shape or direction restrictions. Other advantages claimed include the elimination of surface finishing and the need for skilled operators.

'SMALL, STRONG HORSE'

GRAZ, Austria

THE 1,280 lb cross-country Haflinger, measuring only 4ft. by 4ft., has a high power-to-weight ratio and a low centre of gravity giving the machine a flexibility in operation that has already attracted the attention of British forestry interests.

The Haflinger—the name means a small, strong horse—is produced by the Steyr-Daimler-Puch firm here who also manufacture motor-cycles, scooters, and mopeds.

The backbone of the Haflinger, the main chassis and transmissions, has the engine-gearbox unit attached at one end; the four wheel assemblies spring out at either end; and the whole thing is surmounted by the body.

Its lightness means that two people can handle it. The differentials on this four wheel drive machine can be locked by the use of a lever while still moving. The value of this is in the face of unexpected hazards. When three wheels are slipping if the fourth can find a grip the "small, strong horse" will move.

The power unit is an air-cooled horizontally opposed, twin cylinder o.h.v. four-stroke petrol engine, 650 cc, producing 22 bhp at 5,400 rpm.

First developed for the Austrian Army, the Haflinger has tackled steep, muddy, wooded country in demonstration for British Forestry Commission, War Office and other government officials.

In one test the vehicle was sunk in the mud until the top of its wheels had disappeared. Hitched to a nearby tree it then winched itself out.

The Haflinger is imported into the UK by Ryders Auto Service, Liverpool, 20.

Henry Simon in the EEC

THE HAGUE

THREE companies are being set up in Holland with the assistance of Henry Simon (Holdings), of Stockport, as manufacturing bases in Europe for the Common Market.

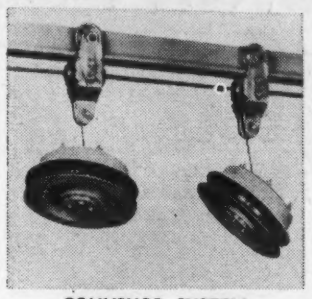
Two of the companies will have factories in Amsterdam to produce presses and parts for animal-feed milling machines.

The main company—Simon and Europa N.V. in Amsterdam, whose capital is almost entirely held by Henry Simon (Holdings)—will co-ordinate the companies' activities throughout the Common Market.

NEW Equipment

Multi-level factory conveyor system

BASED on the same principles as their hand or power operated single track overhead handling sysem, British MonoRail Ltd. have now introduced the Cable-Way system which differs from standard MonoRail equipment in that the rail can rise and fall according to the gradients of the factory layout. This feature permits a single track to cover several floors or working levels.



CONVEYOR SYSTEM
For changes in level

The conveyor is operated by an endless cable which is driven by one or more motor drives, either constant or variable-speed, which incorporate adjustable slip clutches.

Maximum hanger carrying capacity is 250lb. and safety devices are available to prevent loads from slipping down inclined tracks in the case of power failure. The Cable-Way system is readily fitted to existing buildings and, once installed, the layout can be easily changed. **British MonoRail Ltd., Brighouse, Yorkshire.**

Reader service reference No. 221

Prefabricated store

Called the Geospace Dome Shelter, this structure is formed from lightweight triangular panels of half-inch expanded polystyrene board laminated between waterproofed kraft paper. The panels, which weigh only 3lb. each, are coated with resin to give protection from the weather and, in the case of damage, can be easily removed and replaced.

The complete structure, which is 12½ft. tall, weighs 450lb. and contains 352 sq. ft. of usable storage space, is equipped with a hinged

PREFABRICATED STORE
Can be lifted by four men

double door, window openings and ceiling vents.

The dome can be erected in less than a day by two unskilled men, can be lifted or carried by four men or quickly dismantled for transportation or storage. No foundation or special site preparation is necessary as the dome bolts to a wooden base ring which is then staked to the ground.

A smaller version of this shelter known as the Domette will also be available. It is nearly 7ft. tall, 9ft. in diameter and weighs less than 100lb. Two people can assemble it in two hours with ordinary hand tools.

The Geospace Dome is suitable for a wide variety of storage purposes and the Domette has many applications both domestic and in industry. **Monsanto Chemicals Ltd., Monsanto House, 10-18 Victoria Street, London, S.W.1.**

Reader service reference No. 222

Heat operated alarm

Making the "Break the Glass" type of alarm fully automatic, the Flag conversion system uses a cartridge with a special tip of a low melting point substance. In operation, when the temperature rises to the preselected level, the tip melts and allows the alarm circuit to close. The tip material can be varied to enable the user to select the temperature at which the alarm operates.

The conversion consists of removing the spring-loaded plunger from the existing alarm point and substituting the conversion cartridge. It is emphasised that the conversion in no way prevents the point from being operated by the conventional method. **The Flag Co., Star Street, Little Horton, Bradford 5.**

Reader service reference No. 223

Telephone meter

The Gensign direct reading telephone meter records minutes and seconds so that operators and users can see at a glance when a call starts and finishes and can record the relevant figures. Two sizes are available: Meter 5, size 11⅛in. by 6¾in. is for switchboard rooms or individual offices; Meter 12, size 22¾in. by 13½in. is for large offices. **General Signal and Time Systems Ltd., 73 Great Peter Street, London, S.W.1.**

Reader service reference No. 224

Level indicator

Operating on the principle of changing electrical capacitance as material builds up along the length of a wire electrode installed in the container, the Quantimeter equipment provides a continuous indication of the level of stocks either at the container or at some remote point, as required. A particular feature is the inherent compensation against errors caused by variations in the moisture content of the materials.

This compensation arrangement ensures that measurements are reliable even when equipment is used on hygroscopic solids. Indication is linear throughout and six capacitance ranges are provided to ensure that the equipment can be used on a wide variety of materials. **Lancashire Dynamo Electronic Products Ltd., Rugeley, Staffs.**

Reader service reference No. 225

Surface grinder

The Precisa FS2 hand-operated surface grinder, a vertical spindle, swing - head, bench - mounted machine, capable of giving up to a 7 micro-inches C.L.A. finish on difficult materials, can deal with diameters up to 7¾in. and rectangular areas up to 6 x 12in. and 4 x 16in. The 3 h.p. three-phase motor and grinding spindle are dynamically balanced as a unit, the high-frequency hardened grinding spindle is more than 1½in. thick and the main pillar diameter is over 3½in.

The vertical feed scale which is optically magnified is calibrated in units of 0.00025in. All bearings are sealed and complete protection of the feed spindle by high-grade leather bellows should retain the claimed accuracy of the machine throughout its life. Various special accessories are available for the machining of different materials. **The H. G. Stevens Co. Ltd., 16 Coverdale Road, London, N.W.2.**

Reader service reference No. 226

Metal baling press

Mounted on wheels with solid rubber tyres, the Fawcett 100-ton scrap metal baling press produces bales weighing 120-140lb. and measuring 12in. square at the rate of 20-30 bales per hour.

The trampling lid is operated by a hydraulic, double-acting ram and side pressure is provided by twin hydraulic rams; the main ram ejects the completed bale through the end door. The lid and box are fitted with replaceable liner plates.

The press is supplied complete with pump, motor, tank piping and control gear. Motive power can be either electric or diesel or both, with switchgear where required. **Fawcett Preston & Co. Ltd., Bromborough, Cheshire.**

Reader service reference No. 227

Screwdriver kit

The Steadfast Multiblade Ratchet Screwdriver has an amber plastic pistol grip incorporating ratchet action barrel with positive blade locking device. There are four interchangeable blades comprising Nos. 1 and 2 socket cross point, engineers type and electricians type. The kit is packed in a press studded plastic wallet. **J. Stead & Co. Ltd., Manor Works, Cricket Inn Road, Sheffield 2.**

Reader service reference No. 228

Industrial gloves

Made from acrylonitrile latex and manufactured under the name Chirco-lon, these gloves are claimed to be remarkably resistant to industrial greases, oils, solvents and acids. They are specially recommended for use in conditions which render natural rubber and neoprene synthetic rubber unserviceable and cause P.V.C. gloves to break down through rapid embrittlement.

The fingers are shaped and the glove is lined with an elastic interlock cotton. Available in men's sizes 8½ and 9½ the overall length of both sizes is 10½ inches. **The Chichester Rubber Co. Ltd., Watling Street, Dunstable, Beds.**

Reader service reference No. 229

Sand separator

The Krebs centrifugal sand separator is a device for removing fine sand, scale and similar materials from water. Energy for operation is derived from the main circuit pumps and efficiency is claimed to be better than 97 per cent. Standard sizes available have capacities from 50 gal. a minute to 1,600 gall. per minute and larger sizes can be built to order. **Neldco Processes Ltd., Crossway House, Bracknell, Berkshire.**

Reader service reference No. 230

Spring coiler

Intended for use in manufacturing plants where small quantities of springs are needed for experimental work or short production runs, the hand-operated Carlson spring coiler can make up to 400 accurate compression, extension or torsion springs an hour. The coiler makes springs with coils closed or squared on both ends; extension springs tightly wound, close wound or open wound and torsion

SPRING COILER
Up to 400 springs an hour

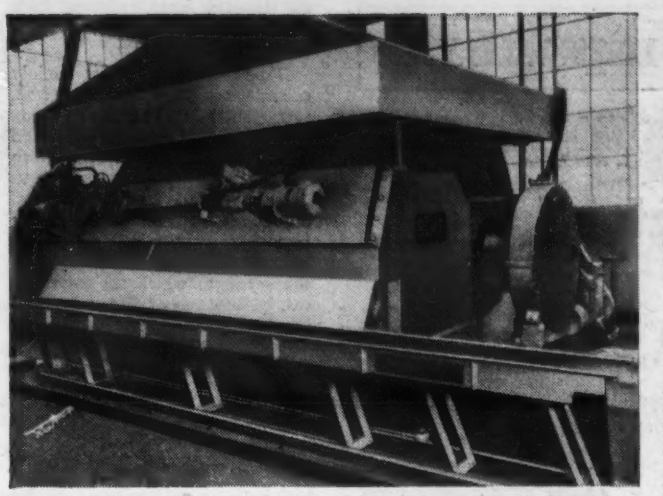
springs right or left hand, with short or long extended arms for forming hooks or loops.

There are two models available: No. 1 has a capacity of .004 to .063in. wire diameter and can wind springs up to 1in. O.D. and 4in. long; No. 2 takes wire between .041 and .156in. and can wind springs up to 2in. O.D. and 8in. long. **Bennett Tools Ltd., Arthur Street, Redditch.**

Reader service reference No. 231

Vibratory conveyor

Vibratory movement of materials is achieved by the Magco Type MFU/B conveyor. It consists of a trough mounted on a series of springs set at an angle and vibratory motor units, flexibly connected to the trough, impart a back and forth movement. This



VIBRATORY CONVEYOR
Handles hot sintered material

movement, in the form of an arc, induces a hopping forward motion in the material being conveyed.

Supplied as completely self-contained units in lengths from 6ft. up to 75ft., the drive units may be coupled together in any number until the required length is achieved. Sequence interlocking of the units can be provided to ensure that sections are started up in the required order and so prevent build-up.

The conveyors will deal with hot sintered material, powders, bulk materials, bagged or cartoned materials or any product that a normal belt conveyor will handle. **Magco Ltd., Lake Works, Porchester, Hants.**

Reader service reference No. 232

Laboratory pumps

Two stainless steel laboratory pumps have been introduced—the Concordia P.30 and P.50 models. The pump impellors are coupled direct to the motors and the pumps can run immersed provided that the motors are well above the surface of the liquid. Working temperatures can be between −20°C. and 110°C.

The P.30 gives a flow of 2½ pt. a minute, consumes 30 watts and weighs 22 ozs. The P.50 gives 5 pt. a minute, consumes 40 watts and weighs 27 ozs. Standard motors are for connection to 230-volt mains but other voltages can be supplied to order. **Jones and Stevens Ltd., P.O. Box 35, Eastern By-Pass, Littlemore, Oxford.**

Reader service reference No. 233

Flash tester

This non-lethal flash tester with a range of 0-5 KV., 50 c/s., gives a maximum short current of 1 milliamp. It is housed in a steel case with a carrying handle and is equipped with a voltage indicating meter and a voltage setting potentiometer, on-off switch and push-to-operate button. Earth lead and high voltage probe are provided and fuses are fitted. The unit weighs 20lb. and is recommended for production line checks on transformers, switches, control gear and domestic appliances. **Witton Electronics Ltd., Bickford Road, Birmingham, 6.**

Reader service reference No. 234

NEW Materials

Impregnated p.t.f.e. endless belts

COMPOSED of a base fabric of glass fibre woven into endless bands, these belts are impregnated with p.t.f.e. to give a smooth, non-stick, heat resisting surface.

Developed for polythene wrapping machines and other heat-sealing applications where temperatures of up to 200 deg. C are normal, it is claimed that as there is no joint or lap in the circumference of the belt, its life is considerably increased.

Made in a standard circumference of 49in., 0.010in. thickness, widths up to 8in. are available. Smaller circumferences can be supplied to order. **Tannoid Ltd., Church Row Works, Wandsworth Plain, London, S.W.18.**

Reader service reference No. 235

Polypropylene yarn

Manufactured under the name Ulstron, this multifilament yarn is claimed to have great strength, extreme lightness, negligible water absorption and excellent chemical resistance. The first commercial uses of Ulstron will be for fishnetting, twines and ropes in the marine field but it is expected that, due to its excellent properties and low price, it will find many applications in other industries. **Imperial Chemical Industries Ltd., Fibres Division, Millbank, London, S.W.1.**

Reader service reference No. 236

Powder extinguisher

Primarily intended for the extinguishing of metal fires in the radioactive groups such as plutonium and uranium, this ternary eutectic chloride powder also has applications in dealing with other materials such as magnesium, sodium and potassium. Fire tests have been carried out with these metals and in each case they have been successfully extinguished. Tests carried out on magnesium alloy aircraft wheels for example, even when suspended, were very successful and fragmentation did not occur.

The powder, when applied to burning metal, generally melts at a temperature below that of the burning temperature of the metal concerned, and a skin is formed; this skin completely excludes air and the absorption of latent heat exerts a cooling effect. **John Kerr & Co. (Manchester) Ltd., Ashcroft Road, Kirkby Industrial Estate, Liverpool.**

Reader service reference No. 237

Drafting tapes

Printed in dense colours on pressure-sensitive, clear film which does not shrink or discolour, Chart-Pak tapes have a very wide application in the field of drafting. Produced in widths from 1/64in. to 1in. uses include production of printed circuit layouts, charts and graphs. Special narrow width tapes are available for producing curves and, with the aid of a Chart-Pak tape pen, broken, dotted and dot-dash lines can be made.

Also available are: various templates of office furniture, spaced letters, Contak shading films in 46 different patterns for producing shading effects on line drawings for dyeline reproduction.

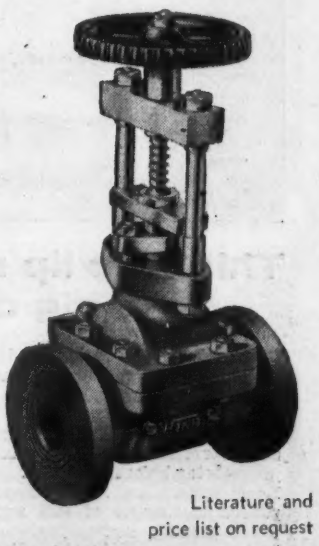
A fully illustrated brochure of the wide variety of tapes available can be obtained from: **Lawes Rabjohns Ltd., Abbey House, Victoria Street, London, S.W.1.**

Reader service reference No. 238

WINN VALVES..and Value

Valves and fittings for steam, water, air, oil, gases and chemical fluids — in gunmetal, steel, iron and special alloys. For high, medium and low pressures, in sizes up to 16 inch.

OVER 1,000 TYPES AND SIZES STOCKED



"The true measure of value is not to be assessed today, or next year — but lies in the satisfaction of many years of trouble-free service and the justification . . . of wise choice."

Literature and price list on request

CHARLES WINN & CO. LTD
Makers of good valves for more than a century
GRANVILLE STREET, BIRMINGHAM, 1

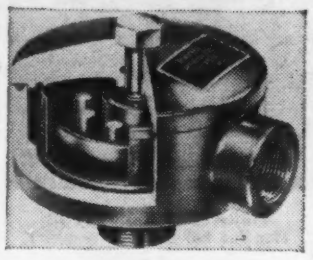
NEW Components

Magnetic filter has mesh strainer

REMOVAL of ferrous contamination from lubricants, coolants and cutting oils improves the finish and prevents excessive wear on machine tools. A magnetic filter which incorporates a gauze strainer removes both ferrous and non-ferrous materials in pipeline systems and a range of these filters is available with capacities between 250 and 3,300 gallons per hour suitable for pipe sizes ¾in. to 1¼in. B.S.P.

Cleaning is very simple. A twisting movement and the complete unit is ready for the extracted contamination to be washed off the magnet and mesh. The period between cleaning operations depends on the percentage of contamination but the average time would be every two hours. **Rapid Magnetic Ltd., Lombard Street, Birmingham 12.**

Reader service reference No. 239



MAGNETIC FILTER
Easily cleaned

Terminal blocks

Designed for use at 250 degrees C. continous, 300 degrees intermittent, this range of terminal blocks consists of porcelain blocks with silicone glass fabric separators mounted on steel channels. The 2 B.A. tinned brass studs are fitted with links, nuts and washers. Alternative stud materials are phosphor bronze and stainless steel.

Also available is a 15 amp 6 way moulded terminal block with barriers between ways, suitable for fitting into a small circular conduit box. Fitted with 4 B.A. clamp screws, the block is 2¼in. diameter and ¼in. deep with two fixing holes at 1¼in. centres.

Austin Taylor Electrical Ltd., Thorley St., Failsworth, Manchester.

Reader service reference No. 240

Saturable reactor

Available in sizes up to 12 KVA, Electro Methods "C" core saturable reactors are claimed to be considerably cheaper than more complex types of transductors while still satisfying a wide range of power control requirements. The reactors consist of specially wound a.c. and d.c. bobbins through the centre of which pass high grade strip wound "C" cores to form a three limb construction. This assembly is embraced by aluminium alloy channel which forms a rigid structure and terminal blocks for all electrical connections are fitted to the top channel and are provided with a protective cover. **Electro Methods Ltd., Caxton Way, Stevenage, Herts.**

Reader service reference No. 241

Snap connectors

A sub-miniature r.f. connector designed to give proper electrical contact after repeated making and breaking of the connection has been introduced. It is a Sealectro Conhex design and is available in all standard types including both straight and right-angle connectors.

Damage to connectors mainly occurs when they are disconnected, as instead of a straight pull being applied they are frequently forced out of axial alignment. This action weakens the spring and results in poor electrical and mechanical connection. In the new design there is a hexagonal member of solid brass over the spring which limits the extent to which the connector can be bent out of alignment. Life is said to be greatly increased. **The Sealectro Corporation, Hersham Factory Estate, Walton-on-Thames, Surrey.**

Reader service reference No. 242

Fuel reserve valve

Guarding against the chance of running out of petrol, this valve makes provision for the last gallon or so fuel in a tank to be held as a reserve. To bring the reserve into use the driver turns a switch on the dashboard and at the same time an indicator lights while the reserve supply is being used. This light will also serve as a reminder to turn off the reserve switch when the tank is refilled.

It is capable of being fitted to all shapes and sizes of present day tanks with the aid of a bayonet type fixing unit. **S. Smith & Sons (England) Ltd., Cricklewood, London, N.W.2.**

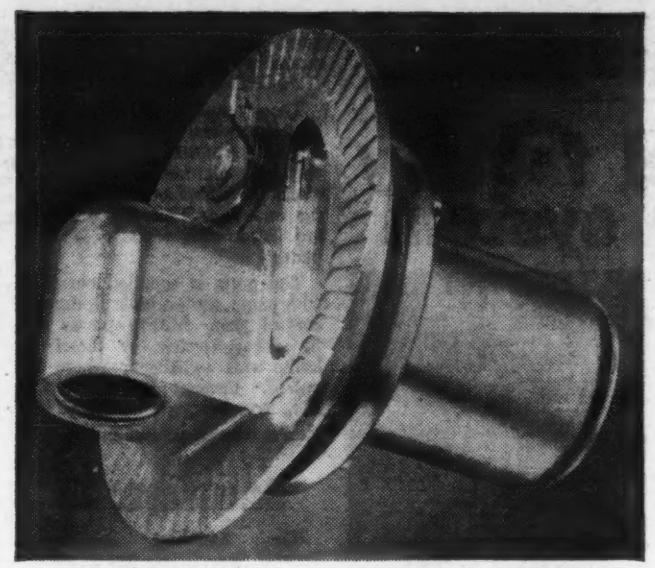
Reader service reference No. 243

High vacuum valves

A range of high vacuum valves featuring unobstructed bores of 1in., 2in., 4in. and 6 in. diameters with hand or pneumatic operation is available. The valve body and sealing disc are made of dense 2 per cent silicon-aluminium alloy with hard coated slideways. Stainless steel valve stem and screw thread inserts are standard.

The total leak rate at a pressure of 10^{-5}mm. mercury is less than 10^{-10} at m. cc./sec. across the valve disc either way against atmospheric pressure. **Vacuum Research (Cambridge) Ltd., Quayside, Cambridge.**

Reader service reference No. 244



FUEL RESERVE VALVE
Reminds drivers

Impulse counters

Accurate counting of 100 impulses a second is possible with the Elmeco electro-magnetic impulse counter. The rotor of the impulse motor is driven and stopped exclusively by electro-magnetic means which enables continous operation at high impulse frequencies with a high degree of silence and the minimum of wear and tear. Drive from the motor to the figure drums is by a toothed plastic belt. Resetting to zero can be achieved either by mechanical or electro-magnetic means. The operating life of this high speed counter is guaranteed to 6 x 10^8 counts when used in conjunction with specified equipment. **Inglis Knibb & Co., 20/21 Tooks Court, London E.C.4.**

Reader service reference No. 245

HRC fuse links

The Aeroflex-Deelynk range of fuse links are for use in substation boards and link type fuse boxes and are interchangeable with other fuse links having standard fixing centres. They have a proved breaking capacity of 35 MVA, category 440 AC5 and are certified to the requirements of B.S.88 1952.

Other features include the fitting of indicators, the rewireability characteristic common to all Aeroflex fuse-links and the provision of units with current ratings in excess of the maximum normally associated with each of the three fixing centres. **Parmiter, Hope & Sugden Ltd., Longsight, Manchester.**

Reader service reference No. 246

Cam followers

A range of needle bearing cam followers for use in automatic machinery has been introduced. The rollers are uncaged to allow the maximum number to be used and to give a large number of contact points, and the followers are claimed to be superior in load-bearing properties to any other design. They are said to be particularly suitable for applications where high static loads are encountered.

Sizes available range from 16 mm. to 52 mm. outside diameter, the outer races being slightly convex to allow for misalignment. Each follower is supplied complete with a mounting stud hardened and ground to bearing tolerances, and grease nipples and locknuts are provided. The makers stress that standard followers of this type can simplify both the design and maintenance of automatic machinery. **Insley Industrial Ltd., 5 Windmill Street, London, W.1.**

Reader service reference No. 247

NEW Publications

A standard range of 19 different types of machine mounts for various combinations of weight and operating characteristics of many types of machines are described in an illustrated brochure by Cementation (Muffelite) Ltd. These mounts, which require no fixing to the floor, isolate the machine from outside vibrations and also prevent the machine from affecting others in the vicinity. The main advantages claimed for the mounts, which are selected by the company's engineers for any particular machine, are ease and low cost of mounting and re-siting of machines, elimination of damage to floors, reduction in noise level and, of course, the elimination of vibration.

Reader service reference No. 248

Self-lubricating bearings are the subject of an illustrated leaflet from Pollard Ball and Roller Bearing Co. Ltd. Covering a very wide range for many applications, these bearings are injected during manufacture with sufficient lithium base grease to last their working lives. Special greases for high and low temperature conditions are available.

Reader service reference No. 249

Development, features and applications of the RE301 transportable magnetic tape recorder are described in an illustrated leaflet by E.M.I. Electronics Ltd. Designed for the professional user, the RE301 is fitted with in-line heads, two separate record and two replay amplifiers enabling a recording to be made on either track or both tracks simultaneously. Applications include recording of phenomena of a transient nature for later detailed analysis, and investigations into the control and suppression of noise in a wide variety of industries.

Reader service reference No. 250

Four booklets issued by Addo Ltd., describe with the aid of illustrations their range of automatic data processing equipment. **Addo-x electrical input and output** deals with single or double register adding machines with either sterling or decimal keyboards. The input unit enables these to be used as digital strip printers and data-loggers. **Punched paper tape** covers the machines producing this form of data for the automatic control of machine tools and other industrial equipment.

Addo-x punched card system deals with machines for transferring numerical data on to punch cards. Both the punch tape and punch card machines can be coupled to the standard adding-listing machines. The general introduction to punch card applications is in the fourth booklet which gives flow charts and describes operations.

Reader service reference No. 251

Closed Circuit Television. A booklet issued by E.M.I. Electronics Ltd., deals with equipment and applications in many industries. The booklet explains how it works, gives a review of the industries and particular uses, lists the various additional accessories available for special applications, and gives technical details of the standard equipment.

Reader service reference No. 252

A leaflet from Bruce Peebles & Co., Ltd. gives details of their standard chassis-nest assembly which facilitates production of prototype and small-quantity runs of electronic equipment. The assembly consists of a rack into which can be mounted six plug-in type front-mounting chassis units. Each chassis will accommodate a standard 9in. by 7in. circuit board and the internal depth of each unit is sufficient to accept miniature valves in standard cans.

Reader service reference No. 253

Some of the many engineering uses of silicones are described in an illustrated leaflet from Midland Silicones Ltd. These products come in many forms: in fluids for damping and indicating purposes; in insulants, paints and seals, enabling them to withstand high temperatures; in release agents; in greases and waterproofing preparations. Also available are three publications dealing with silicones in engineering, electronics and domestic appliances.

Reader service reference No. 254

READER ENQUIRY SERVICE

November 16, 1961

Please circle the reference number on the item on which you would like further details. Post to Reader Service Department, Engineering News, Heywood & Co. Ltd., Drury House, Russell Street, Drury Lane, London, W.C.2.

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BLOCK LETTERS THROUGHOUT

Your name .....

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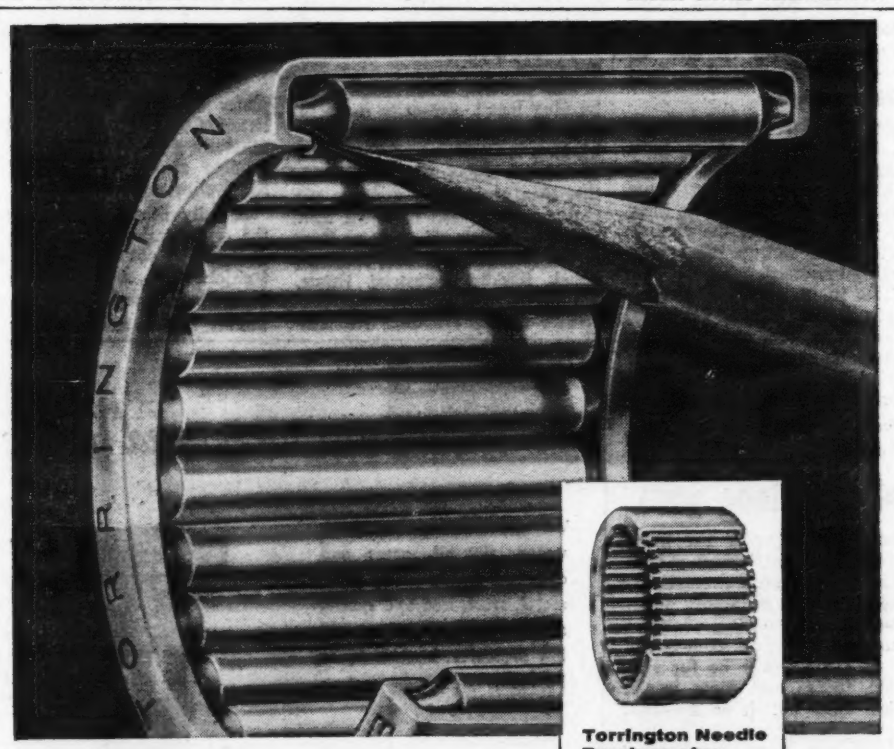
Nature of business .....



This little lip makes a big difference!

The turned-in lips of the Torrington Needle Bearing not only retain the rolling elements making the bearing a truly complete unit, they also provide against the loss of lubrication.
The closely controlled clearance between cup lips and shaft form an effective labyrinth seal which facilitates pregreasing before assembly.
Long experience in thousands of applications has proved the merit of this and other features of the Torrington Needle Bearing.
Make sure your product benefits from the best that experience has to offer—specify Torrington Needle Bearings.

THE TORRINGTON COMPANY LTD

Bearings Division: Torrington Avenue, Coventry. London & Export Office: 7-10 Eldon St., EC2. Glasgow Office: 50 Wellington St., C2

Torrington Needle Bearings give you these benefits

- *High radial load capacity*
- *Low co-efficient of starting and running friction*
- *Low unit cost*
- *Long service life*

B.52/G

THE SECOND Engineering Materials and Design EXHIBITION and CONFERENCE

STAND No. F6

EARLS COURT

ENGINEERING CONTRACTS

Japan bank order for De La Rue

JAPAN'S banknotes are to be printed in future on 15 De La Rue banknote printing presses to be supplied by Thomas De La Rue and Co. under contracts worth more than £1 million. Installation of all 15 will be complete by mid-1962.

Eight stainless steel road tankers have been ordered by Bulwark Tranport from Liverpool's Andrews Brothers (Bristol). The tankers will be used to carry edible and fuel oils.

* * *

The Isle of Man Electricity Board have placed a repeat order with Mirrlees, Bickerton & Day, for a Mirrlees/Brush diesel generating set.

The set is made up of 12 cylinder KVSS diesel developing 3,096 b.h.p. at 428 r.p.m. directly coupled to a 2,200 kW Brush alternator. Fifteen Mirrlees/Brush sets will be in use in the Isle of Man by the end of next year.

* * *

A second Smith ME 11 truck crane, with a lifting capacity of 10 tons is on its way to Burma, fulfilling an order from the Burmese Ministry of Defence.

The ME 11, the smaller of the two truck cranes made by Smiths of Rodley, handles a variety of lifting operations, meeting the need in Burma for more mechanical handling equipment than static lifting gear.

The two most powerful single line reheat steam turbine generators to be installed in Australia are to be provided by English Electric under a £4 million order.

Two turbines

Two 350 MW steam turbine units, similar to those on order for the CEGB Drakelow "C" and Blyth "B" power stations have been ordered by the Electricity Commission of New South Wales, the first to go into commercial use in November, 1966, and the second a year later.

Both sets will be manufactured at the Rugby works of English Electric.

* * *

A new acrylic fibre factory in Yugoslavia is to have an automatic demineralisation plant by William Boby & Co., the Hertfordshire water treatment engineers. The contract for the 7,000 gallon an hour plant was placed by Courtaulds.

* * *

A British consortium of Platt Brothers (Sales), Marples, Ridgeway and Partners, and Associated Electrical Industries is to provide, and hand over as full working installations, two cotton ginning and baling factories for the Sudan Gezira Board.

£150,000 for AEI

AEI are supplying the electrical equipment, worth £150,000, and including motors, control gear, power factor correction equipment, capacitors, switchgear and other equipment.

The first factory is to be completed in February, 1963, and the second a year later.

Another £150,000 order for AEI, received through its Australian company, is for 39 outdoor, high voltage oil circuit breakers, at 66 kV 2,500 MVA, for the State Electricity Commission of Victoria.

BSA forms engineering division

THE BIG GROUPS RESHUFFLE

FINANCE AND COMMERCE

Smaller engines increase Bristol Siddeley range

IMPORTANT changes in the organisation of two of the largest British industrial groups give greater influence to local management in one and rationalise aero-engine production in the other.

Birmingham Small Arms have carried their policy of giving operating companies greater responsibility by creating a general engineering and a metal components division. Hawker Siddeley have sold the de Havilland Engine Co. and the Blackburn Co. to Bristol Siddeley Engines for cash. Bristol Siddeley is 50 per cent owned by Hawker.

BSA's general engineering division will be made up of four companies. They are: BSA Guns, Carbodies, Monochrome, and a new company, BSA (Redditch), which will carry out motor-cycle and stationary engine work now being done at Redditch.

All four companies of the metal components division are engaged in time-saving and cost-reducing methods of production. They are BSA Metal Powders, BSA Sintered Products (this is the new title of Metal and Plastics Components), BSA Precision Castings, and Iroson Motor Cylinder.

Lost wax castings

Mr. R. F. K. Belcham, managing director of the components division, has said that the Redditch foundry of BSA Precision Castings is to be enlarged to meet increasing demand for investment (lost wax) castings.

The productive potential of BSA Sintered Components at Sparkbrook, Birmingham, is being doubled.

BSA is now grouped in five divisions: motor cycle, machine tools, steel, general engineering, and metal components.

Hawker Siddeley's move was described by Sir Roy Dobson, managing director of the group, as "a tidying-up process to bring under a single control the group's aero engine design, development and manufacturing activities."

The effect of the merger is to increase the smaller power range of Bristol Siddeley.

TRADE AGREEMENTS

VILLIERS EXPAND OVERSEAS

TWO new overseas companies have been formed by the Villiers Engineering Co., of Wolverhampton, who produce the Villiers two-stroke road vehicle engines and the Villiers and JAP agricultural and industrial petrol and diesel engines. The purpose of the new organisations is the expanding of existing Commonwealth and European trade.

Villiers Engineering (NZ) has been set up in New Zealand, in association with F. W. Cave, the company's local representatives. In West Germany, Deutsche Villiers Engineering und JAP, GmbH has been formed, with headquarters in Bremen.

Tower Sales, of Leeds, have been appointed sole world selling agents for the industrial applications of Gleniffer Diesel Engines.

Gleniffer Engines, of Anniesland, Glasgow, have been producing engines since 1908. Their first diesel, which appeared in 1929, was one of the first three British high speed diesels introduced at that time.

Concentration has so far been on marine propulsion applications. Attention is now to be paid to the use of the engines in electrical generation, pumping and drilling rigs.

Private lines

Two telephone companies engaged in the hire and maintenance of equipment of private equipment have been bought by Standard Telephones and Cables.

The companies whose share capital has been acquired by STC are Phoenix Internal Systems Telephone, and the Private Telephone and Electric Co.

The Elgar Machine Tool Co. have been appointed exclusive distributors of the plastics and rubber processing equipment made by Joh. Kleinewefers Sohne, of Kreffeld, West Germany.

The range includes extrusion machines and complete extrusion plants.

AEI ship generators to Canada

GENERATOR stator of the first of four AEI 150 MW turbine generators for Canada being swung aboard the Cunard Co.'s Andria at Liverpool.

The stator, weighing almost 150 tons, is going to the Wabamun power station of the Calgary Power Co., travelling the last part of the journey by Canadian National Railways, who removed an outcrop of rock at one point to allow the stator to pass.

CABINET SHOWS 'VISION'

BRITAIN'S ironfounding industry is competitive in basic costs such as labour and raw materials and is maintaining a general lead in productivity over its European opposite numbers.

This is suggested on the basis of "such statistical evidence as is available" in the annual report of the Joint Iron Council's executive committee.

The council supports British entry into the Common Market and refers to the steps now being taken as "signs of vision" on the part of the Government.

Disturbing aspects reported by the executive committee are the rates of advance being achieved in some of the EEC countries and their relative cost stability.

The condition that the Joint Iron Council mention for continuation of the industry's success in competing with European producers in non-European markets as the gradual move is made towards tariff-free competition in the European market is the finding of "positive solutions to the problems of inflationary increases in basic costs."

Four Worksaver fork lift pallet trucks to be shipped to Holland next month will bring the number of trucks exported to the Netherlands by the British materials handling division of The Yale and Towne Manufacturing Co., Wednesfield, to more than 150.

Export opportunities

ARGENTINE: air conditioning equipment. The Argentine State river fleet organisation, EFDEA, have issued a call for tenders, No. 60/61, for air-conditioning equipment. Quotations on the basis cif, Cadiz, Spain. Specifications from EFDEA, Licitaciones y Compras, Corrientes 389, Buenos Aires. Bids to be opened on December 5, 1961. ESB 34080/61.

INDIA *(before production work is begun make sure that an imports licence will be given)* Sintering Furnace. One batch type molybdenum sintering furnace (for sintering Uranium oxide pellets under hydrogen) for temperatures up to 1750°-1800°C. Capacity about 75 kg of U02 pellets.

Bids should be sent to the Purchase Officer, Atomic Energy Establishment, Trombay, Mohatta Building, Palton Road, Bombay 1, quoting tender No. AEE/P/CAP/5878. Closing date, December 7, 1961.

Shunting Machines. Two petrol driven, hand shunting machines, similar to Locopulsor Shunting Machine type 601 illustrated in M/s E. G. Steele & Company Ltd., leaflet. Bids to the Deputy Controller of Stores, Integral Coach factory (Perambur), Ayanavaram, Madras 23, quoting tender No. ICF/P9/OT/46. Closing date, December 11, 1961. ESB 34315/61.

SUDAN: Machine Tools. One boring and facing machine: drilling and boring spindle: diameter 3in.; morse taper in nose No. 5; traverse 2ft. 6in.; number of speeds 16; range of speeds 10 to 400.

One universal milling machine table, working surface 49in. x 11in.

Bids should be sent to the Assistant General Manager (Supplies), The Sudan Gezira Board, Barakat. Closing date, December 6, 1961. ESB34347/61.

Inquiries should go to the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, W.C.1, before dates given. References (ESB) should be quoted.

BSA CATERS FOR JAPAN

THE Birmingham Small Arms machine tools group is manufacturing machines under substantial contracts to Japanese users and has larger quantities of machines at the "definite order" stage.

Single and multi-spindle automatic lathes, broaching machines, and centreless grinding machines are among £52,000 worth of equipment now being produced in Birmingham. Similar machines are among the £190,000 of firm orders.

These contracts include a proportion of repeat orders for Japanese electrical engineering concerns and others.

Agricultural engineering improves

FALLING profit margins are not deterring the agricultural engineering companies from steadily improving output. A six per cent improvement in production up to the end of September has now been achieved, with a 12 per cent increase in the home market sales of tractors.

Levelling off in the export figures given by the Agricultural Engineers' Association is shown in a four per cent gain up to the end of September, a lower level than for January to August.

While tractor exports were up by three per cent the drop in combine harvester sales abroad continued, bringing the total for the first three-quarters of the year down to 34 per cent below the level of 1960's first nine months.

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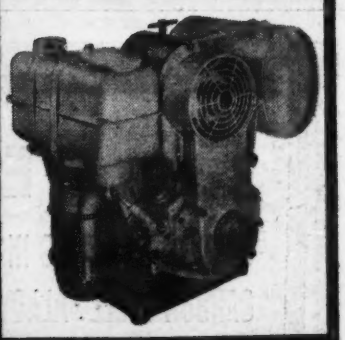

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FINANCE AND COMMERCE

Adverse company reports keep prices down

WEEK IN THE CITY

BY OUR CITY EDITOR

ADVERSE company news continues to have a restraining effect on share prices, though it was noticeable last week that the natural optimism of the British investor, where industrial shares are concerned, was beginning to reassert itself.

Buying, though no more than moderate, was fairly widespread.

The optimists were able to draw some encouragement from a recent speech by Mr. Selwyn Lloyd. The Chancellor said that the balance of payments was improving and that there might be strong expansionary forces at work again early next year.

Worse to come?

It is unlikely that Mr. Lloyd had any pre-determined idea of giving a lift to the Stock Market, but the "bulls" appeared to have read into his remarks an indication that the worst may not be over in regard to the country's economic problems.

This deduction is perhaps premature, and it is certain that in the field of company results there is still plenty of depressing news to come.

But, against this, a fair amount of bad news has already been discounted in share prices and a shortage of stock has tended to accentuate rallying influences.

A plain warning that all is not yet set fair is provided by the interim statement of Guest, Keen and Nettlefold. A total dividend for the year is to be maintained at 16 per cent, but the directors add that profits before tax may be as much as £8 million below last year's level of £30.8 million.

Steels low

Pressure on profit margins has had an increasingly severe effect especially on the steel companies, and the largest overseas company, John Lysaght (Australia) has been hit by a recession in the motor and domestic appliance industries. Whereas GKN dividend for 1960 was covered about 3½ times by earnings, it seems likely that for 1961 it will be covered not much more than twice.

The GKN statement is interesting because it was their chairman's warning (in the last annual report) that profits might decline which, as much as any other single factor, deflated the Stock Market boom in the late spring.

Ahead of GKN's interim report, the market has succeeded in shrugging-off a number of adverse items of company news, notably the fall of more than 50 per cent in the British Motor Corporation's trading profit and the decision of Pressed Steel not to pay an interim dividend. Partly because of labour troubles, Pressed Steel's 1961 results are likely to be poor, though the board are hopeful about long-term prospects.

Profits down

The Birmingham Small Arms results for the year to July 31 last were very much in line with expectations, with pre-tax profits down from £3.4 million to £2.9 million and the total dividend maintained at 11½ per cent.

A warning about pressure on margins had been given last May. The dividend yield on BSA is about 5½ per cent.

Ford stages U.S. revival

BRITISH-BUILT Ford cars are staging a come-back in the U.S. market. Last weekend 500 cars were shipped to the U.S. east coast. The total exported since September is 1,400.

New models and reorganisation of marketing play an important part in the recovery. A team of Dagenham executives have been in America for some months improving distribution and promotion.

Recent introduction, Classic, Capri and Anglia estate cars, and the well-established Anglia, are well up on the list of models being exported.

Lake & Elliot

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COSTS AND CARS BRING SWIFT CHANGE

STEEL STOCKS FALL QUICKLY

ISB figures show a 23 per cent drop in October production

STEEL stocks held by users and merchants were falling as fast in the third quarter of this year as they had been rising in the third quarter of 1960. This swift change in the fortunes of the steel industry, in which the high cost of money and level of activity in the car industry played a part, is shown in the Iron and Steel Board's October production statement.

Steel production in October was 23 per cent below the level of October, 1960. The average weekly output for this October was 382,200 tons. This was a fall of 4.5 per cent from the September rate caused by the stoppage at the Steel Company of Wales' Abbey and Margam works.

The Iron and Steel Board expects that the loss in deliveries of finished steel products due to the dispute will be made good by the end of next month.

Rolling stock improves

Merchants' and users' steel stocks fell during the third quarter by 4½ per cent, some 210,000 tons of finished steel.

Not since 1958 has consumption of finished steel in the U.K. fallen in the third quarter. In that year the third quarter brought a seven per cent fall, followed by a 13 per cent drop in the year's last quarter.

By the third quarter of 1959 steel consumption was rising again, by 1.5 per cent in the quarter. The equivalent period of 1960 saw a 14.5 per cent increase in steel usage.

Now the provisional figure for this year's third quarter is a fall of 4.5 per cent, to 3,296,000 tons.

Deliveries of steel to user industries are all down from last year's level, with two exceptions. Finished steel deliveries to the railways and rolling stock section have shown a consistent rise.

Weekly averages for the third quarters were: 1959, 8,500 tons; 1960, 11,600 tons; 1961, 13,100 tons.

Shipbuilding steel deliveries have held steady at 11,000 tons a week in the third quarter of both 1960 and 1961.

W. EUROPE BOOST OUTPUT

MOST promising of all the information given in the report by the organisation for the General Agreement on Tariffs and Trade on world trade in 1960 is the increase in production in Western Europe of nine per cent. In 1959 the increase had been seven per cent.

When the report turns to Britain's performance the increases become less marked.

Between 1948 and 1960 the value of all exports from the U.K. went up by 54 per cent.

For the nine industrialised countries of the Continent the increase in the same years was 190 per cent.

Differing movements in the export prices of the industrial countries are linked by the report with the varying rates of growth.

Sharpest drop

Suffering a drop in her share of world trade in all the major export markets from pre-war proportions, Britain has met the sharpest reductions in the Latin American states and in the overseas sterling area.

In the light of the continuing arguments over the European Economic Community and the Commonwealth, the figures given for the U.K. share in sterling area imports are important.

Imports rise

In this trade the British share was in continuous decline from 1953 to 1959 and fell further to 25 per cent of the total in 1960. The fall from 1953 to 1960 was from a third to a quarter of the overseas sterling area imports.

Imports into the overseas sterling area shot up between 1959 and 1960 by 17 per cent with the result, despite an increase in the area's export revenue, that the overall balance of trade declined.

In Western Europe the general growth was shared by all countries; the expansion of the Common Market states averaging twice that of the European Free Trade Area members.

£1¼m. FACTORY

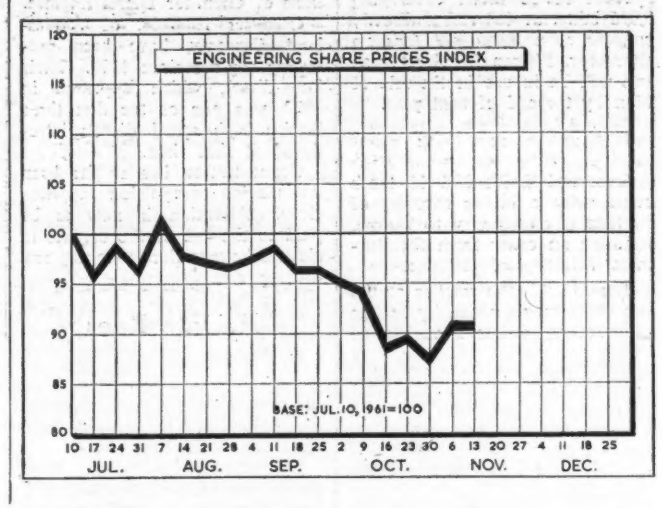
A £1¼ million factory producing aluminium die-castings is to be built by the Rootes group in parallel with their main new car project at Linwood, in Scotland.

CAWKELL AND DAWE DEAL

TWO member companies of the Simms Motor and Electronics Corporation have announced closer trading association following their integration in the group a year ago. They are Dawe Instruments and Cawkell Research and Electronics.

Dawe have now assumed responsibility for exporting Cawkell equipment. The company have agents or representatives in almost 50 countries.

Cawkell exports include a range of non-destructive testing equipment and an oscilloscope equipped with a memory tube and storage circuits able to retain fast transient phenomena for periods up to a week.



NEW Companies

D.E.C. Engineering Services Ltd., 6 Broad Street Place, E.C.2. To carry on the business of consulting engineers. Nominal capital £1,000.

G. Marshall (Coachcraft) Ltd., Cowley Road, Blackpool. To carry on the business of sheet metal workers, panel beaters, vehicle building specialists, etc. Nominal capital £2,000.

W. B. Noon Ltd., Lloyds Bank Chambers, Wolverhampton Street, Dudley, Worcs. To carry on the business of manufacturers and dealers in air compressors, etc. Nominal capital £5,000.

Tilley and Guest Ltd., 311 Aspley Lane, Nottingham. To carry on business of mechanical and general engineers, etc. Nominal capital £100.

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Nov. 13	Ch'ge	Y'ld p.c.
47/9	30/9	Allen, Edgar (£1)	31/9	...	8.3
43/-	25/-	Allen, W. H. (£1)	25/-	...	7.7
77/-	58/6	Angus, George (£1)	67/6	...	5.9
31/10½	19/-	A.P.V. (10/)	32/-	+1/9	3.4
14/1½	8/10½	Asquith Machine Tool (5/)	10/6	+6d.	2.3
48/6	29/-	Assoc. Electrical Ind. (£1)	34/-	+2/9	8.7
16/5	11/8	Assoc. Engineering (5/)	13/6	+3d.	4.9
110/-	83/-	Averys (£1)	82/6	−2/6	3.6
36/9	20/-	Babcock & Wilcox (£1)	21/3	−6d.	...
59/6	40/6	Baker Perkins (£1)	45/-	+6d.	5.0
9/7½	5/10½d.	Beyer Peacock (5/)	7/-	+9d.	8.2
77/-	45/-	Birfield (£1)	62/-	...	3.2
102/10½	68/3	Birmid Industries (£1)	70/3	+1/3	5.8
36/10½	19/6	Birmingham Small Arms (10/)	21/10½	+3d.	5.3
45/6	33/6	Brockhouse, James (£1)	35/6	+1/-	6.9
28/9	22/2	Broom & Wade (5/)	25/3	−3d.	4.3
42/6	29/9	Brotherhood, Peter (10/)	29/9	−6d.	8.2
48/9	30/4½	Brown, John (£1)	33/6	+10½d.	6.4
8/6	4/3	Cammell Laird (5/)	4/3	−3d.	...
39/6	29/3	Carrier Engineering (5/)	29/9	−1/6	4.1
54/3	36/6	Clarke Chapman (£1)	39/-	−1/-	6.9
14/9	9/6	Cohen, George (5/)	9/10½	−1½d.	6.3
33/10½	21/8	Coventry Gauge & Tool (10/)	29/3	...	4.1
12/3	7/3	Craven Brothers (5/)	9/-	+6d.	4.6
24/-	17/6	Crofts Engineers (5/)	20/6	+1/3	4.0
39/7½	30/-	Davy-Ashmore (5/)	30/-	−3d.	4.5
70/-	44/3	De La Rue (10/)	49/6	+3/-	4.5
27/7½	19/9	Delta Metal (5/)	20/9	...	4.7
68/9	50/-	Desoutter (5/)	53/6	...	3.1
41/3	31/9	Dowty Group (10/)	33/-	...	4.6
32/10½	22/4½	Edwards High Vacuum (4/)	30/-	+6d.	2.0
52/-	35/3	Elec. & Musical Ind. (10/)	38/3	+2/-	4.5
38/-	25/9	Elliott-Automation (5/)	35/9	+1/-	1.8
40/6	26/3	English Electric (£1)	31/-	+2/-	6.4
37/3	22/10½	Firth Cleveland (4/)	22/10½	−1/-	5.6
39/6	24/3	G.E.C. (£1)	27/9	+1/3	7.3
65/-	48/-	General Refractories (10/)	48/9	+9d.	5.0
66/6	50/7½	Glenfield & Kennedy (£1)	48/9	...	8.2
108/7½	76/-	Guest, Keen & Nettlefold (£1)	83/-	+2/6	3.8
48/7½	26/6	Haden, G. N. (5/)	30/-	+1/3	3.2
16/6	12/1½	Hall-Thermotank (5/)	12/4½	−1½d.	4.4
24/-	13/4½	Harland & Wolff (£1)	13/4½	−1/9	7.2
33/3	22/1½	Hawker Siddeley (£1)	22/1½	−1/9	9.5
31/-	19/9	Head Wrightson (5/)	20/-	...	3.9
79/9	51/6	Herbert, Alfred (£1)	62/-	+6d.	4.4
95/6	75/-	Hick Hargreaves (£1)	71/3	...	...
138/9	101/3	Hopkinsons (£1)	108/9	−1/3	5.0
25/-	18/6	Howden, James (5/)	20/-	+3d.	6.1
33/9	22/7½	International Combus (5/)	24/1½	+3d.	6.1

1961 High	1961 Low	Stock	Nov. 13	Ch'ge	Y'ld p.c.
57/-	44/9	Lister, R.A. (£1)	55/-	+2/9	5.0
51/9	36/-	Mather & Platt (£1)	36/9	−3d.	5.9
67/-	46/-	Metal Industries (£1)	49/9	+1/-	6.0
71/3	53/4½	Morgan Crucible (£1)	58/9	...	4.7
31/-	18/3	Morris, Herbert (10/)	18/9	+6d.	7.4
52/-	37/3	Murex (£1)	39/6	+6d.	6.5
49/6	40/6	Needsend Steel (5/)	42/9	−9d.	5.9
31/6	20/6	Newton Chambers (5/)	20/6	...	4.7
41/3	20/7½	Parkinson Cowan (£1)	20/7½	−9d.	8.4
72/9	47/-	Parsons, C. A. (£1)	52/3	+3/3	4.7
40/3	38/-	Plessey (10/)	42/9	+1/6	3.5
33/-	16/-	Pressed Steel (5/)	16/6	−10½d.	...
25/3	19/9	Qualcast (5/)	21/-	−1½d.	4.2
38/1½	22/3	Radiation (£1)	22/4½	−1½d.	8.8
22/6	14/-	Ransome & Marles (5/)	15/6	+9d.	4.3
28/6	22/6	Ransomes, Sims & Jeffs (£1)	23/-	...	...
50/6	34/6	Renold Chains (£1)	39/9	+6d.	5.0
52/3	38/-	Reyrolle, A. (£1)	41/6	+2/6	4.6
9/1½	3/4½	Richardsons Westgarth (10/)	3/4½	−6d.	...
9/3	4/9	Roberts, Charles (5/)	5/-	−1½d.	...
48/6	37/9	Rolls-Royce (£1)	37/9	−1/9	5.8
32/6	20/-	Ruston & Hornsby (£1)	21/-	+1/-	8.3
19/3	12/10½	Serck (5/)	12/10½	−4½d.	4.7
23/9	12/4½	Shaw, Francis (4/)	12/4½	−1/1½	6.2
12/-	8/3	Sheepbridge Engrg. (5/)	8/3	−4½d.	8.5
32/4½	19/1½	Simms Motor (5/)	23/6	...	3.7
44/1½	29/7½	Simon Engineering (5/)	32/7½	−9d.	4.2
23/9	13/9	Smith, S. & Sons (4/)	16/-	+1/3	5.0
15/3	11/-	Solar Industries (5/)	11/-	−1½d.	7.8
45/7½	25/1½	Staveley Industries (£1)	26/4½	...	8.2
32/6	18/6	Steel & Co. (5/)	30/9	+9d.	3.6
67/-	39/3	Stone-Platt Ind. (£1)	39/3	−2/3	...
20/4½	14/-	Tecalemit (5/)	15/3	+9d.	5.8
17/4½	12/6	Thompson, John (5/)	12/6	−3d.	1.9
7/-	4/3	Thornycroft, John (4/)	4/3	−1/-	8.6
17/6	11/6	Toledo Woodhead (4/)	16/4½	+1/3	4.7
85/6	55/-	Tube Investments (£1)	68/3	+2/9	4.1
38/4½	25/9	Vickers (£1)	25/10½	−1/-	7.7
157/6	122/6	Walmsley (Bury) (£1)	127/6	...	3.5
84/6	64/6	Ward, Thos. W. (£1)	65/6	−6d.	4.1
17/9	10/1½	Weir, G & J. (5/)	10/1½	−9d.	8.6
47/6	28/4½	Wellman Smith Owen (5/)	29/9	+3d.	3.6
14/1½	10/-	West, Allen (5/-)	10/-	−3d.	6.5
46/3	24/9	Westinghouse Brake (£1)	26/-	...	3.3
36/6	18/6	Whessoe (5/)	18/6	...	7.2
17/-	12/-	Wilmot-Breeden (5/)	14/3	+3d.	3.9
30/-	19/9	Woodall-Duckham (5/)	20/6	+6d.	5.0
64/9	44/6	Worthington-Simpson (10/)	47/9	−3d.	5.2

IRON AND STEEL

43/6	25/7½	Brown Bayley (10/)	35/9	+1/9	4.4	42/-	23/4½	South Durham Steel (£1)	24/1½	−10½d.	9.8
81/3	49/-	Colvilles (£1)	53/-	+10½d.	6.0	47/8½d.	32/4½	Steel Co. of Wales (£1)	33/10½	−3d.	7.3
32/3	21/4½	Consett Iron (£1)	22/1½	−7½d.	8.4	57/4½	40/1½	Stewarts & Lloyds (£1)	40/1½	−2/6	7.4
43/7½	25/4½	Dorman Long (£1)	25/7½	−6d.	7.7	68/7½	42/1½	John Summers (£1)	46/1½	+1/9	6.4
55/1½	37/6	Firth & Brown (£1)	42/6	+2/6	5.8	55/7½	38/-	United Steel Cos. (£1)	43/4½	+1/-	5.6
49/10½	31/1½	Lancashire Steel (£1)	35/6	+1/6	6.1	63/6	46/-	Whitehead Iron & Steel (£1)	48/-	...	6.1

The companies whose share prices are quoted in the Engineering table and which form the basis of the Index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

HEALTH

OHS is a non-profit making organisation set up to improve factory conditions —and productivity

by G. P. JEWELL, A.R.Ae.S: Engineering News Technical Correspondent

SCIENTIFIC study of problems affecting health and welfare of industrial workers is the basis of a service offered by the Occupational Hygiene Service at Slough.

Industrial managements are becoming more conscious of the important part working conditions play in the success of a company, but it is often difficult for them to be aware of environments which create physical discomfort, or even damage to health. The source may be noise, dust, fumes, or a combination of hazards intensified by poor ventilation, heating and lighting.

O.H.S., with its trained team of doctors, engineers, and chemists, is a non-profit making organisation which investigates those problems, and recommends remedies.

It will also advise on possible hazards which may arise in any new process contemplated.

A council of management governs activities with representation from the Ministry of Labour, the T.U.C., the Nuffield Foundation, the B.M.A., the British Employers' Federation, and other industrial organisations and societies.

The laboratories are equipped to carry out environmental studies covering dust analysis, gas concentration, noise measurement, heating, ventilating and lighting surveys.

Help given

Medical examinations and clinical tests can be carried out on affected personnel by a consultant physician.

When a request for aid is received a suitable team is sent to assess the problem and for this work only out-of-pocket expenses are charged. An appraisal of the full investigation required is then forwarded, together with its cost.

It is up to the firm concerned whether further action is undertaken, but if a solution is desired the next stage would be a complete analysis which would involve work both on the site and in the O.H.S. laboratories.

Finally, recommendations are put forward which may involve structural changes, an amendment to a production line, or a change of material used in a process.

Should it prove impossible to alter an offending technique, routine checking methods would be advised to ensure that recommended protective measures are functioning.

It is not unusual for a hazard to be revealed through an effect on an employee. For example, a worker may complain of recurring headaches or sleepiness. An inspection of his employment could suggest that he is being affected by materials in use, perhaps trichloroethylene used for degreasing.

Excess level

Air contamination would then be checked for excessive level. An excess may be found in more than one location. To establish this is important, since it could influence the solution to the problem.

Further evidence may be necessary to confirm the source of the symptoms and this can often be provided by bio-chemical tests to determine the degree of absorption of toxic substance.

The sufferer would be questioned about any other symptoms so that the cause was established beyond doubt.

Other personnel would also be interviewed to ensure that all contributing factors were revealed.

Thus, a complete picture is built up of related facts which give the source, extent and effects of the contamination.

The remedy for this type of trouble may be to improve existing ventilation at a particular point, but the thoroughness of the investigation keeps the cost of necessary alterations to a minimum.

With the constant development of new techniques, the importance of the O.H.S. organisation increases, particularly for firms who cannot afford to employ full-time specialists.

In the U.S. and Canada managements make far greater use of equivalent services. During 1959 a total of 4,794 investigations were made in Detroit alone.

Information on desirable standards is exchanged between these countries and O.H.S., but reports of investigations commissioned by firms are strictly confidential.

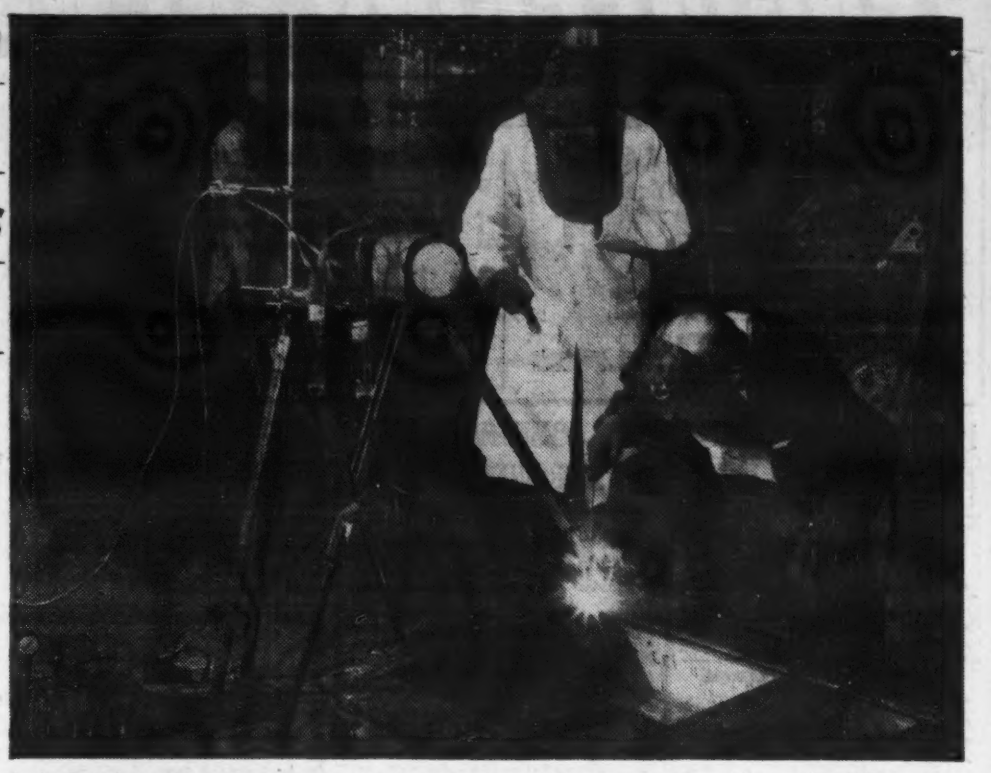
The importance attached to the function of O.H.S. is shown by the financial support received from the Nuffield Foundation. The aim is to make the unit self-supporting, but still non-profit making, as soon as possible.

This is largely dependent on the number of inquiries coming from industry.

Another advantage arising from a greater number of investigations is that more information becomes available. This would decrease the amount of analysis required on some of the future cases, and help to reduce costs further.

To help make O.H.S. more widely known, consideration is being given to establishing headquarters in London. In the meantime, an enthusiastic team at Slough continue to deal with inquiries from all over the country.

Sampling air in the vicinity of a welding operation to determine the extent of contamination by gas and fumes.



Do it now!

Make sure of your copy of Engineering News. Fill in the coupon on page 19.

For most of the plant at Sheffield's Foundry Exhibition this is true . . .

PASSED—THAT SMALL-USER TEST!

'Of educational value for employers and employees'

VIRTUALLY all the plant shown in the Sheffield Foundry Exhibition, at the Somme Barracks, Glossop Road, was subject to one of the greatest "tests" for the "small user"—it had been installed, and in many cases was being operated, on old wooden floors without pre-prepared foundations.

Many small engineering units still have to install new machinery in old premises and have to allow for additional costs in the form of "beds" and re-inforced flooring.

Turnover moulder

An exception was the B.T.1. Turnover Automatic moulder shown by the British Moulding Machine Co, which weighs 2¼ tons, and for which an 18in. concrete bed is recommended.

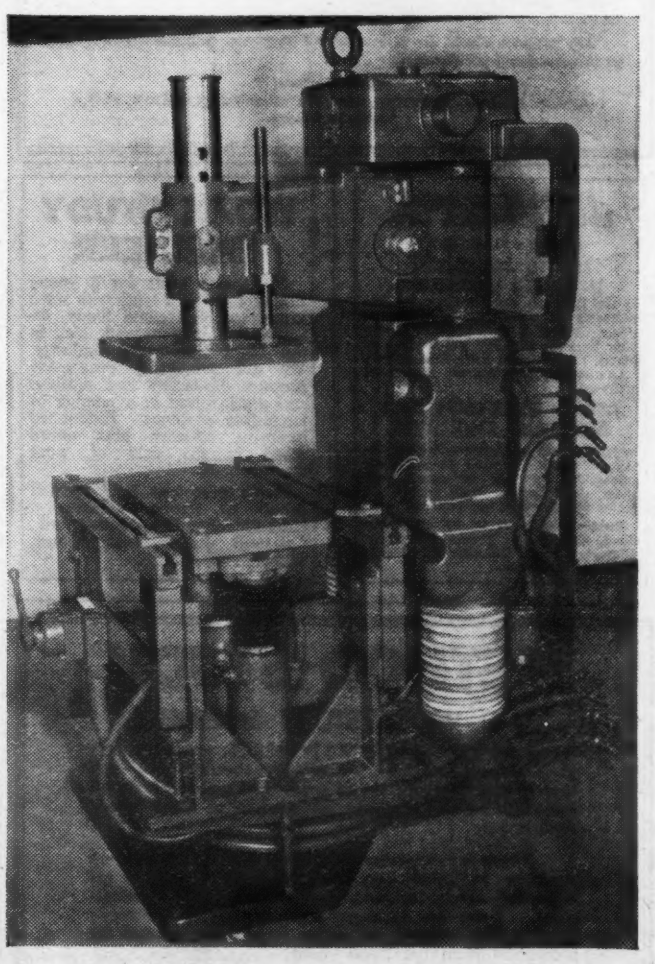
Thanks to the existence of a floor girder, this need had been overcome at Sheffield, where the machine — though operated regularly for short periods throughout the four days of the exhibition — was not required to run continuously.

A new version of the original B.T. Turnover type has a power-operated swing head which tilts and carries the finished mould clear. Other new features are an easily-accessible jolt-timer, which automatically adjusts the jolt-length, and the dual-lever safety mechanism which compels the use of both hands thus reducing risk of accidents.

Later model

A B.Q.1 automatic moulder, shown as companion to the B.T.1 by the same firm is a newer-type of machine designed for the simultaneous production of cope and drag moulds. Weighing only 1 ton 13cwt. it needs no foundation.

The B.Q. offers "press-button" moulding. A shockless, simultaneous jolt-squeeze machine, it has a jolt capacity ranging from 600lb. (the B.Q.1) to 2,000lb. (B.Q.3) and a squeeze-pressure varying from 8,500lb. in the B.Q.1. to 32,000lb. in the B.Q.5.



A BQ1 automatic straight draw moulding machine.

Entirely pneumatic, the automatic controller can be adjusted to cycle in from 6-60 seconds.

Once the "Start" button on the independent control panel has been pressed, the machine will run automatically through all operations, leaving the stripped mould ready for removal. The roll-on roll-off principle is labour-saving, too, in that one operator only is needed, even with large boxes and heavy moulds.

Use of individual buttons, as an alternative to the "Start" button, makes manual operation possible at any stage.

Silicate process

The B.T.1. moulder — which, in its modified form was being shown for the first time — is claimed to have an average capacity of 60 half-moulds per hour, dependent on the box size.

Adjacent to the B.M.M.'s stand —which constituted a fine example of pressure - moulding — the Alkali and Billingham Divisions of I.C.I. had a stand featuring cores, moulds and castings made by the CO_2 Silicate process, while in the main (first floor) Exhibition Hall the Polygram Casting Co. was demonstrating a cheap binder (£800) which was being shown for the first time in the North.

Since it was first introduced to the home market a year or two ago, this rollover coremaker has enjoyed a considerable demand, and it is now being developed for export.

Occupying 2ft. 6in. x 3ft., weighing 3½ cwt, and requiring no special foundations, this pneumatically-operated shell-moulding coremaker operates at 180 p.s.i.

Briquettes

Being shown also for the first time in this country were a new range of ferro alloy briquettes made by the Union Carbide.

First marketed in March of this year — when their modern plant at Glossop Works went into production — these are available in the main ferro alloys used in the foundry trades (silicon, zirconium silicon, manganese, silico manganese, and chromium) and represent the fruits of considerable research.

Notched for easy-breaking into half-size where smaller additions are required — and containing equal amounts of alloy in each half — their rectangular shape is considered a revolution in the packaging and handling of such alloys.

Use of a refractory bonding cement, which keeps the briquette together until it reaches the melting zone of the cupola ensures that binder not used as flux goes to slag, making possible high recoveries of the ferro alloys in the melt — recoveries of the order of 90 per cent, it is claimed, are not "unusual."

Showmanship

The Union Carbide stand was but one of many which made skilful use of colour and modern "display techniques."

Scale working models of a 20 ton direct arc melting furnace and a Detroit rocking arc furnace presented by the Birlec — Efco (Melting) and of the Wheelabrator conveyor Plants which provided an outstanding feature of the exhibit staged by Tilghman's — though they might have limited "customer-appeal" — afforded interest that was in inverse ratio to their scale.

Mutual benefit

Consisting of 31 stands, representative of 28 exhibiting firms, the exhibition covered a wide field, justifying the hopes expressed by Mr. A. Hardy, (President of the Sheffield and District Foundry Trade Technical Society, which, in conjunction with the Sheffield Branch of the Institute of British Foundrymen had sponsored the Exhibition) that, in educational value, it might be of mutual benefit both to employers and employees of the industries concerned.

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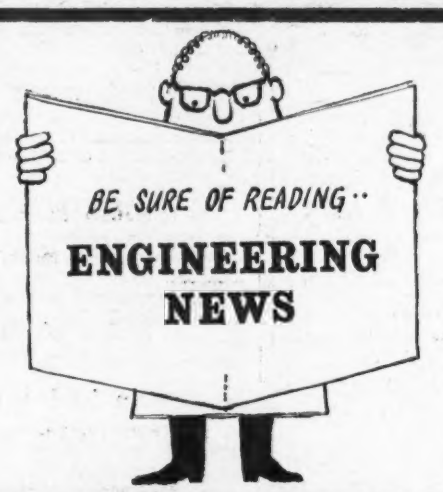

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EN 6

President of the Board of Trade opens Darlington works

£500,000 WELDING SHOP

The first vessel to be stress-relieved in the new furnace at Whessoe Darlington was this 60-ton gas storage vessel.

Whessoe extensions 'boost U.K. capacity by 10 per cent'

IT is believed that the U.K. capacity for building heavy pressure vessels will be increased 10 per cent by a new welding shop opened at Whessoe's, Darlington. The official ceremony was performed on Friday by the President of the Board of Trade, Mr. Frederick Erroll, M.P.

The new shop, 550ft. long and 86ft. wide, can handle vessels up to 125 tons, and together with equipment represents an investment of £500,000.

The stress relieving furnace at one end is 85ft. between doors and 18ft. wide by 18ft. high to the spring of the arch. The temperature range is 400 to 1,115°C with fully floating control. Heating is by town gas. It is thought to be the largest furnace of its kind in Europe.

The 100ft. long X-ray compound located at the same end is designed to give full radiation protection for a million-volt X-ray source.

A special feature of the welding shop is the use of welding heads with columns and booms on rails, operating over a matrix fitted with manipulators which can be located in any position.

Each set of rotators can handle vessels up to 50 tons, or 100 tons when coupled.

Nuclear vessels

The new extensions are part of the redevelopment of the Whessoe works which has been proceeding since 1945 at a cost of £4 million.

Nuclear developments stimulated their interest in the heavy pressure field and no less than 14 such vessels have been, or are being, built. Orders have been completed both for Calder Hall and an Italian station at Latina.

Mr. M. J. Noone, director and joint general manager, said the new shop would secure output for the next decade, but export opportunities on tankage were not what they had been.

"Nowadays," he said, "developing countries seem to think nationalism is best served if their own people build these tanks.

"However, Whessoe will go on to vessels which need more complex thinking. And for that reason half a million pounds have been spent to show faith in Whessoe's workmen and skills."

U.S. is to develop hydrofoil

AMERICA is to develop a hydrofoil research craft at an estimated cost of 12 million dollars. The contract is listed in the U.S. Navy's programme for next year.

Indications are that the craft will be about 200ft. long with a displacement of 300 tons.

The ship is expected to travel at 50 knots at first, and will ultimately reach 75-85 knots when fitted with super-cavitating hydrofoils still under development, the U.S. Department of Defence states. It is expected the craft, when operational, will open up new vistas in anti-submarine warfare.

Russia in front

Russia has already released pictures of a hydrofoil craft she has recently developed for river travel.

Italy has been running a successful commercial hydrofoil service for the past four years across the Straits of Messina.

And Canada is operating a military application of the hydrofoil.

MACHINE TOOLS SHOW

SOME 60 modern production and toolroom machine tools are being demonstrated at the N.W. London showrooms of Rockwell Machine Tool Co. up to November 22.

Among the exhibits is a Fritz Werner punched-tape controlled milling machine which has not been previously shown in the UK.

The control system was developed in collaboration with Brown Boveri whose punched-tape control mechanisms are extensively used for operating Continental machine tools.

The machine is provided with a high-precision rack for each direction, i.e. longitudinal, traverse and vertical movements.

Meshing with this rack is a play-free pinion which drives a form of synchro system. This, in turn, generates a voltage corresponding to the position of the table.

The voltage is compared with the input data and when the two values coincide, a relay is operated which brings the table to a standstill.

Largest two speed motor

AFTER three years research and development, the Lancashire Dynamo and Crypto Co., in co-operation with Bristol University, and the National Research Development Corporation have produced the world's largest two-speed, single-winding squirrel-cage induction motor.

It was demonstrated at LDCs Trafford Park works last week. A number of these are destined for power stations in Europe.

Speed changing in these motors is by pole-amplitude modulation, an invention of Professor G. H. Rawcliffe, professor of electrical engineering at Bristol University.

LATE NEWS

TEMple Bar 3422

Increase of 330 exhibitors booked for Hanover Fair, April 29 to May 8, 1962—total taking part, 4,450. Over 1,125 of these will be foreign.

● from front page

rollers running in vertical guides and the front of the carriage forms a platform which receives the pallet load of material.

The pallet rests on rollers fixed to the platform and is pushed into and drawn out of the rack by means of a tractor unit running on guides in the platform.

At each end of the carriage is a driver's cabin with duplicated controls so that the operator can seat himself nearest to the rack being used.

All controls are of the push-button type with an emergency stop button for each cabin. The main hoisting mechanism consists of a motor with attached micro-speed unit driving twin hoisting barrels through oil-immersed worm gear units.

Lifting of the carriage is arranged through two ropes, one from each barrel with each rope on two falls. A safety device holds the carriage if a rope breaks.

Safety device

Two speeds, fast and slow, are fitted for both hoisting and crane-travelling. The tractor unit has one speed. The motors are Demag self-braking type with tapered rotors.

Pallets are loaded onto the crane by a 3-ton suspension crane running on three tracks. The two cranes are so arranged that the platform of the stacker crane comes out from between the racks to a position under the suspension crane.

The complete installation also includes one 5-ton and one 10-ton Acrow-Demag suspension crane capable of interlocking with each other for transfer purposes, and two automatic telpher systems.

SOVIET STEEL AT COLVILLES

A CONTRACT to roll 60,000 tons of Russian steel in their new cold reduced strip mill at Gartcosh has been signed by Colvilles.

This follows a similar contract with Russia by the Steel Company of Wales. The Gartcosh mill is expected to start production in December and it is part of Colville's £83m. development.

SEVEN POINTS FOR SAFETY

TWENTY-SIX per cent of reportable accidents are due to faulty handling of goods. This statement was made by Mr. George Hickling, Industrial Welfare Society and Central Council of Physical Recreation expert in manual lifting and handling, to delegates at the annual Industrial Health and Safety conference organised by the IWS and held last week in Manchester.

"In these modern days mechanisation is looked upon as the solution of all materials handling problems," he said. "Unfortunately this is not so; mechanical handling can and will help considerably to reduce the very high accident rate resulting from this phase of industrial operations.

"But it will still continue to occupy a very high position in the accident league unless the operative is taught a safe method of handling manually.

There are seven points to remember when handling materials:

- A good firm stance; feet not wider apart than the width of the hips, with one foot comfortably in front of the other.
- Head raised with chin tucked in.
- Straight back, not necessarily vertical.
- Arms close to the centre line of the body.
- A good firm grip.
- Feet arranged for succeeding movements.
- Proper use of body weight.

Two sections merge at BWRA

BY integrating the Welding Process and Resistance Welding sections the British Welding Research Association has created a new department, the Welding Technology Department, at the Association's Abingdon Hall, Cambridge, headquarters.

Administration will be in the hands of Mr. P. T. Houldcroft, formerly chief metallurgist of the Association, with Mr. A. A. Smith, previously head of the welding process section, as his deputy.

The department will carry out research on new and existing welding techniques, promote effective use of welding methods and provide basic data for design.

TORQUE CONVERTERS OFFERED FREE

APPLICATIONS for the 20 torque converters being offered free to U.K. universities and technical colleges by Twin Disc have been coming in to the Editor, following last week's announcement in Engineering News.

The units will transmit 300 h.p. at an input speed of 2,100 r.p.m., but they are equally suitable for power ratings of 5 h.p. upwards at very low input speeds.

Universities and technical colleges who are interested in this unique offer should write to the Editor without delay.

Float glass plant at St. Helen's

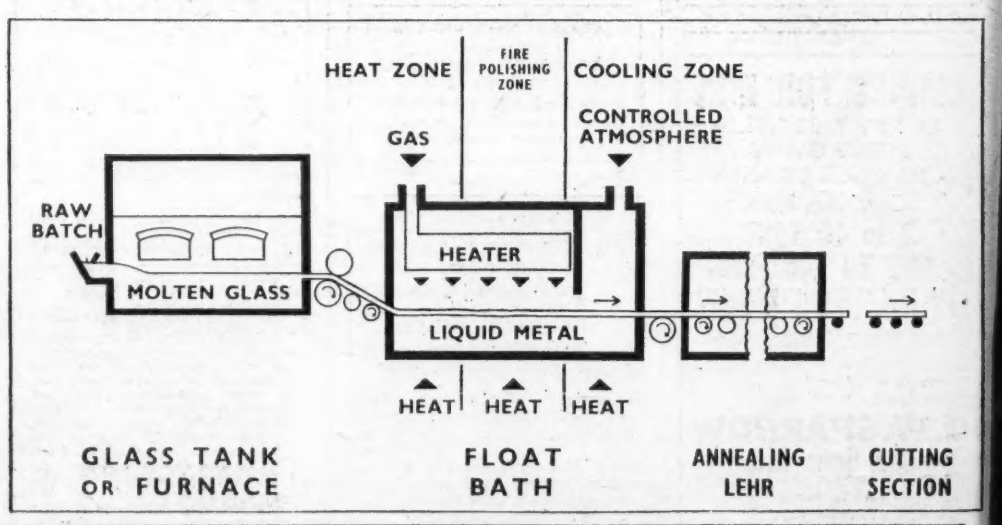
AFTER 85 years the traditional method of producing polished plate-glass at Pilkington Brothers, St. Helens, is being replaced by the float glass process.

The twin-grinder closed down indefinitely yesterday and the last plate-glass tank will finish making rough cast glass on November 22.

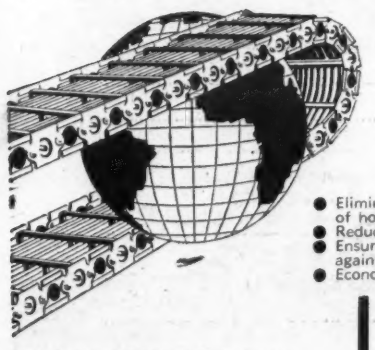
A second and larger float glass tank is being built at St. Helens and it is expected to be producing early next year.

Float glass needs no grinding or polishing and the technique is the result of a successful research programme started by Pilkington in 1952.

In the process, the molten glass flows from the furnace on to a bath of molten metal. It then takes up the brilliant and perfectly flat configuration of the surface of the molten metal.



THE MODERN WAY TO CARRY CABLES AND HOSES



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